



CHEETAL

JOURNAL OF

The Wildlife Preservation Society of India

Dehradun

Vol. 49

February 2011 (November 10 to February 11)

Nos.2



Photo - Rajeev Mehta

Published with financial assistance of

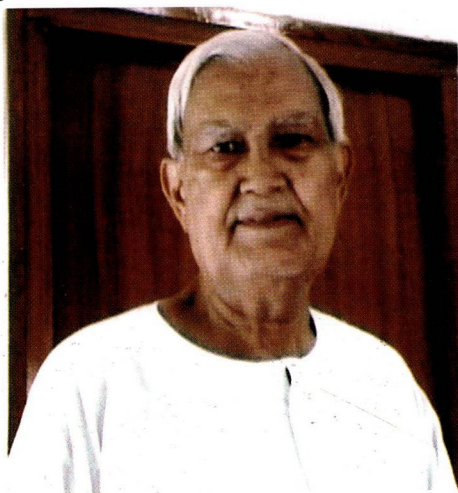
WWF-India



Black Bulbul

Photo - Bhagat Singh

Sri I.S. Negi, Hony Secretary, Wildlife Preservation Society of India, DDun, passes away



We regret to inform our members that Sri Indra Singh Negi, Honorary Secretary of WPSI passed away on 20th Feb 2011 after prolonged illness. Late Sri Negi was the Hony Secretary of our Society since 1992. Born on 11th June 1927 at village Moli in Lansdowne Tehsil of Pauri Garhwal district, he got his schooling at Adharyakhal and Jaiharikhal in his home district. After graduating from Balwant Rajput College Agra he was inducted in UP forest service as Forest Ranger. His educational and training career was bright. His name figures in the Honors list of Jaiharikhal Inter College for securing good position in UP Board. He got a gold and a silver medal during DDR training (Dehra Dun Rangers) in the NFRC (Northern Forest Rangers College). His service record as Forest Ranger, Assistant Conservation of Forests and Dy. Conservator of Forests was excellent and he retired as an Indian Forests Service officer. His last posting was DFO Mussoorie from where he retired in June 1986. He took over as Honorary Secretary of Wildlife Preservation Society of India at a time when the Society was in turmoil and with his hard and dedicated selfless efforts nurtured the Society back to its respectable status. He used to contribute informative articles for the 'Cheetal' which was published regularly under his guidance except when his health condition did not permit him during a brief period of about 2 years before 2005. Late Sri Negi had strong will power and complete dedication to his work. He was an experienced and knowledgeable forest officer with keen observation power and thorough field knowledge. He is survived by his wife, 2 sons and 5 daughters all of whom are well settled. He leaves behind a large friend circle, relatives and grand children to prey for his soul to rest peacefully in the heavens.

A.S. Negi

Contents

Abohar Wildlife Sanctuary – An Unique example of community driven conservation programme	<i>A.S. Negi, Dr. S.N. Prasad and Dr. A.M. Dixit</i>	1-3
MAN-WILDLIFE CONFLICT – RUNNING FOR LIFE	<i>Vinod Rishi</i>	4-9
DEMOGRAPHIC STUDY OF ASIATIC ELEPHANTS IN NORTH INDIA	<i>Dr. K.N. SINGH</i>	10-19
ANTLERS AND HORNS OF THE INDIAN UNGULATA – A REVIEW	<i>Y.C. Rai</i>	20-32
Urban birds of Udaipur city (Rajasthan) and their conservation problems	<i>Vijay Kumar Koli, Chhaya Bhatnagar and Mohm. Yasheen</i>	33-38
कृषि विकास और वन्य प्राणि	डा० एस०पी० सिंह एवम् डा० विजय लक्ष्मी सिंह	39
Birds of Garhwal and Kumaon Impact of Climatic and Environmental	<i>Bhagat Singh</i>	40-43
<i>From the archives of Cheetal</i> The Importance of Sanctuaries (Including National Parks) in the Conservation of Threatened Species of Large Mammals in South and East Asia	<i>E.P. GEE</i>	44-50
News & Views		51-65

Abohar Wildlife Sanctuary – An Unique example of community driven conservation programme

*A.S. Negi, **Dr. S.N. Prasad, ***Dr. A.M. Dixit

Background

World over, there has been a strong and growing emphasis being given to new paradigms of conservation. The old model of state supported 'hands off' wild life and nature conservation is being questioned by a variety of stakeholders. Alternate strategies include the community approach for conservation. India traditionally has been in the vanguard of community driven natural resource conservation. However, over the past couple of centuries, this tradition has weakened considerably. There are however many good examples of these conservation traditions. This article reports such an effort in Punjab where today the Blackbuck's western most distribution ends.

Abohar is a small town in western Punjab situated in Firozpur district. It is close to the Sate boundaries of Rajasthan and Haryana. The countryside has intensive agriculture, as in rest of Punjab. Of Late large number of Kinnu (A sweet citrus fruit developed by crossing two species) orchards have come up in the surrounds of Abohar. Irrigation which was scarce only a decade ago has improved substantially with network of canals.

Management Effectiveness Evaluation

I along with my two scientist colleagues, Dr. S.N. Prasad from Hyderabad and Dr. A.M. Dixit from Ahmadabad were entrusted with an evaluation of Management Effectiveness of Protected Areas of Northern India by Ministry of Environment and Forests, Govt. of India and Abohar Wildlife sanctuary (WLS) of Punjab was one of the six areas allotted to us for evaluation during 2010. All three of us met in Delhi and proceeded for Abohar by road.

Though Management Effectiveness of 11 protected areas had been evaluated before taking up this Sanctuary, nevertheless, we were excited to visit and know about Abohar WLS as it was situated in the revenue land owned by farmers with little community land and no forest land within its boundary. At Abohar we were joined by DFO Wildlife Firozpur district and Range officer Incharge and field staff of Abohar WLS. Next morning a Forest Guard met us at the Guest House who gave us certain literature comprising of list of 363 Vishnoi martyrs of Chipko movement of KHEJDALI village in Jodhpur Rajasthan and some other information about Vishnoi culture. The Forest Guard himself was a Vishnoi from one of the villages comprising the Abohar WLS. It was pleasure to talk to him and see his commitment towards conservation. He was grandson of Late Sri Sant Kumar Vishnoi, a well respected person who was President of "All India Jeev Raksha Vishnoi Samaj", and a winner of Indira Gandhi Paryavaran Puruskhar. He was also the first Honorary Wildlife Warden of Abohar WLS and had spearheaded the creation of Abohar WLS. His statue (Bust) stands at one of the important road crossings in Abohar town as mark of respect to him. Later on we were joined by DFO/RO and others for the field visit of the day. When we left for the field visit, surprisingly the Vishnoi Forest Guard who met us in the morning was missing. We were told that he was asked to stay away from our field inspection. The DFO and Forest Ranger briefed us about the Wildlife Sanctuary. We were told that the Vishnoi's are erecting mud walls and barbed wire fences around their fields and orchards and have large number of pie dogs to chase away black bucks from their fields. We were given the impression that the Vishnois are no longer interested in protecting black bucks and blue bulls and have infact turned against them due to damage to their crops and orchards. With this background in mind we set out to visit this unique Sanctuary.

About Abhothar Wildlife Sanctuary with Total Protection Extended to it by Vishnois

Abohar WLS was created in 1975 in 13 of the 16 Vishnoi villages close to Abohar township. Other 3 villages are not contiguous with these 13 villages being situated some distance away with

non Vishnoi villages in between. Vishnoi villages are inhabited predominantly by Vishnois with other casts as well. Vishnois in these villages own major landholdings. Most of them have good agriculture mostly irrigated. Community lands are dry, saline with scattered *Prosopis juliflora* bushes and other weeds. The fertile community land has been encroached by influential farmers. The area of the Sanctuary is 186.15 sqkm. with no forest land within the Sanctuary. As we entered the Sanctuary we could see blackbucks in small groups or single males in wheat fields or barren lands. The encroachment of community land has shrunk the black buck habitat particularly during farming season. The spread of Kinu orchards surrounded by mud walls or barbed wire fences have also contributed to shrinkage of their habitat. There are several ponds in the villages connected with Canal water that have good population of fishes some of them growing to large sizes, mostly various species of Carps. The villagers are totally vegetarian and do not kill fish at all. We did see large number of street dogs most of them with robust health. They must be chasing wild animals. When there is no crop to be irrigated, then the canals dry up and wild animals feel scarcity of water and have to visit village ponds etc. The pinch period may be around 2 months in a year. We saw herds of blue bulls/cows in wheat fields at several places, some very close to habitation. Black bucks at this point of time were mostly seen on barren lands whereas the blue bulls/cows were seen in wheat fields.

As the first impression, we did feel that the Vishnois have changed their attitude towards wildlife but during our two day visit when we interacted with a number of villagers not one of them talked about the damage to their crop and property by wild animals. In fact damage to crop was not at all an issue with them. Protection of orchards and ripe crop to minimize damage is fully justified. This is resorted to by farmers even from their own tame cattle. No farmer will ever let their own cattle loose in their fields when the crops are ready for harvest. It will be too much to expect them not to fence their fields against these wild animals who go in herds and raid the crops and leave little for harvesting. The farmers never grudge the damage is evident from the fact that they have never raised a demand to de notify the Sanctuary or ask for permission to shoot the blue bulls/cows which is a usual practice in all other PAs in the country. On the contrary the Sanctuary has been created on their initiative and they are continuously demanding that the other 3 Vishnoi villages left out from the WLS should also be included in the Sanctuary or a separate Community Conservation Reserve should be created in these villages. We met a local political leader, some ex honorary WLWs and Member State Wildlife Advisory board from among the Vishnois and to our utter surprise they informed that they have always opposed the demand of shooting blue bulls/cows by farmers elsewhere in the State. They are even opposed to payment of compensation for crop damage, a demand so repeatedly raised all over the country.

Interacting with Vishnoi farmers in one of the villages was an eye opener and inspiring. All elderly people were of the view that in their 16 villages their crops have never been damaged by natural calamities like hailstorm etc. They sincerely believe that it is the compensation provided by God for their tolerance towards wild animals. They feel that at least 10% of everybody's earnings should be given in alms for good cause and their crop damage never exceeds this limit. One family head took us to the grave of his father close to their house and pointed out that a black buck always comes and rests near the grave. He pointed out to the browsed wheat plants as evidence near the grave. They were feeling highly obliged to the wild animal who paid regular visit to the grave of their respected father who himself was a great conservationist and true Vishnoi. Vishnois inspite of following Hindu religion bury their dead ones to save the wood that is used in cremation of dead bodies. One of the young boys of the family who was studying for his graduation in Jammu had come on leave for attending marriage of his brother. I raised doubt whether his commitment to his culture was being diluted in the company of others while living out of the community. He very firmly said that he never befriends those who are non vegetarians neither he ever takes a room with non vegetarian family and totally avoids eating place where non vegetarian meal is served. I felt very small by doubting this youngman. The family's hospitality and love was so touching that we did not like to leave their company and had two rounds of tea and porridge offered by them. In another village we witnessed a house wife and a young girl standing on the courtyard watching 5 blue bulls feasting on

their wheat crop which was almost ready for harvest. They were laughing and not driving them away. Asite very unusual for a farmer's family.

Nobody from within the villages or outside can ever dare to poach wild animals in the Sanctuary without inviting the ire and displeasure of Vishnois. They take out their guns and chase them away or snatch their firearms and inform the Forest Guards immediately. They provide tractor or any other available vehicle to forest people for carrying injured animals or transporting offenders or chasing them. Even in the peripheral villages the Vishnois keep an eye on poachers and pass on information to Forest Deptt.

The attitude of Forest Department

The villagers had no grudge from the local forest field staff but they were very critical of the attitude of the department at higher level. The grudge seems justified as the budget provided by Govt. of India for the Sanctuary is not being utilized for the past several years. There is no independent Forest Ranger for the Sanctuary. There is no honorary Wildlife Warden appointed for this unique Sanctuary which is mostly managed by the community. Even after 35 years of notification of the Sanctuary there is no management plan. The vehicles are out of order for several years. The Veterinary hospital provided for the Sanctuary is not functioning properly. The only Vishnoi Forest Guard of the Sanctuary is facing disciplinary action for advocating the cause of the Sanctuary. The management at higher lever instead of appreciating the commitment of Vishnoi community towards conservation and Wildlife protection is trying to doubt their sincerity and defame them.

Looking at the dismal picture on the part of Govt. department, we as a Committee entrusted with Management Effectiveness Evaluation made certain recommendations outside the frame work of evaluation, to MOEF, GOI to make this Sanctuary as an example of Community Management being set by Vishnois who are known for their total commitment for conservation. Most of them live in Rajasthan but some also reside in Punjab, Haryana, MP etc. The history of their conservation culture goes back to 1730 AD when 363 Vishnoi men and woman laid their lives to prevent felling of Khejari trees (*Prosopis cineraria*) by the Army of King of Jodhpur Marwar. The women first to lay her life was Amrita Baniwal with her three young daughters. Several examples of sacrifices by Bishnois for conservation can be found. Latest example is the sacrifice of Birbal Ram of Lohwat village in Jodhpur district, who faced bullets of poachers to save a black buck on 17th September 1977. The cases of Salman Khan and Nawab of Patudi facing legal battle for poaching black bucks made headlines in National newspapers. The case of Salman Khan relates to poaching of black buck (schedule I species) in Vishnoi area of Rajasthan in which there was a Vishnoi witness who stuck to his statement till last, which resulted in prosecution of the accused.

Spiritual/religious aspects of wild life conservation

The Vishnois draw their inspiration from Shri Jambheswar Ji Maharaj who is worshiped by the community as their spiritual Head and God. An annual fair at a place in Rajasthan draws Vishnois from all over the country and it is in this fair that their commitment to conservation is renewed year after year. This community is totally committed to conservation even in a modern world of consumer culture. Their 29 point code of conduct enunciated by Jambhoji Maharaj is religiously followed by all Vishnois. What Vishnois follow is need based but what most others follow is greed based. In spite of the numerable examples being set by this community from time to time, we are not able to follow even few of the codes of conduct that they follow. It would seem that a variety of approaches steeped in spiritual/religious, economic incentives, education and administrative measures are needed to stem the alarming decline of wild life in the country

MAN-WILDLIFE CONFLICT – RUNNING FOR LIFE

Vinod Rishi

Shafts of golden sunlight lit the green vault of the sal forest behind my house. Summer was at its peak, and sal trees had been shedding their leaves. The forest floor wore a yellow-brown carpet of dried leaves. Through it snaked a vague deer path. Wary of making noise, I advanced, treading softly on the path. My ears caught the faintest of the jungle sounds – the buzzing flight of a bee, the scrape of a lizard's claws, and the faraway flutter of wings. Even more than my ears and eyes, I was alive to the spirit of the forest – I could feel the forest.

Suddenly, through the corner of my eye, I saw a small patch in the pattern of shade and light on the ground about fifty feet to my left, rustle for a moment. I thought I might have imagined it, but I wanted to be sure; for one must not ignore small messages and little signs the forest gives to the one who wants to be there. I froze. I did not turn my head for a better look, waiting for it to happen again.

Moments stretched out like minutes beat past my heart. It happened again; a spot of light in the dappled leaf bed twitched. I slowly turned my head to have a better look. There she was: a leopard suckling her two cubs as she lay on her side with her back towards me. I could see her through the thin screen of a lantana bush in which she lay. Filtered down through the green canopy of leaves the rays of the sun etched out her youthful form with a golden sheen. Her flank rose and fell rhythmically as she slowly drew in and let her breath out. The heads of her two cubs were just visible over the curve of her body. It was the little white spot at the end of her long tail that had caught my eye as she twitched the tip of her tail in contentment.

A wave of fear and surprise shook me. I did not expect this part of the forest to be inhabited by a leopard; there wasn't enough prey in it to sustain a leopard. People had killed and eaten away most of the wild animals that a leopard hunts for food.

But there they were: a mother and her two cubs. I know a mother can fearlessly face any threat to her children; and here was a mother armed with razor sharp claws and dagger-like fangs. I feared that she would resent my intrusion. It is different when you watch a leopard in a zoo. You watch it from the safety of a viewers' gallery. But if alone and unarmed you meet her on her ground with nothing to stop her charge, you do not want to catch the attention of a loving and caring mother leopard with her cubs. Pound for pound, a leopard is said to be the strongest of the big cats of the world. You would rather enjoy the sight of a beautiful spotted big cat playing with her cuddlesome babies in a zoo.

One of the cubs happened to peer over the reclining body of his mother. Its eyes locked on me. I might have made some movement that had caught his eye. It stopped feeding. The mother stood up and turned a reproachful eye toward me. For a fleeting moment she drew her ears back, flat against her head; and cast an appraising glance at me. Her mouth slightly ajar, a faint growl came out of it; but her eyes said she was not alarmed. Without wasting another look at me, she turned and led her cubs away from me; deeper into the lantana thickets, and was out of my sight.

I turned back; elated and content at the beautiful sight I had just witnessed in the forest behind my house. I felt I should take a chance to see them again early next morning.

But I did not get my chance. It had been one of the hottest and driest summers to have struck the forest in recent years. The forest was tinder dry. The hot day waned and sun shimmered down the western horizon. In the thickening dusk, tongues of fire leapt up the bank of a *nullah*, half a mile to the west of where I had seen the leopard family. Someone had set fire to the forest. The evening breeze fanned it; and it quickly gained in strength. In no time at all, the entire forest was on fire. Flames leapt high up into the leafy branches of the tall sal trees. Sparks flew, and bursts of crackling and exploding sounds of twigs and branches filled the air as they caught fire. The forest turned into a red and yellow wall of angry flames. Dark crying silhouettes of the dislodged and frightened roosting birds flitted

across the wall of fire. Over the myriad sounds came the death cries of unseen dwellers of the forest.

The fire reached the edge of the forest. Crops were ready for the harvest. We rushed in to beat the fire out. A Forest Patrol arrived from the nearby Range Headquarters and tried to control the fire. But the blaze could not be contained. All that could be achieved was to check its advance at the narrow road that separated the fire from the crops.

The following day saw the forest smoldering in silence; thin wisps and ribbons of smoke arose from among the ashes and the burnt tangle of bushes that had covered the ground a day ago.

It was a heart-rending sight. Scorched skeletons of tall trees stood mourning their dead friends and young ones. In the deathly stillness of the forest, the charred bones and ribs of a small deer stood out parched white against the fire-blackened ground. The forest, which was alive with life and sound a day before, was sad. That evening I was told that the fire had killed more than a dozen monkeys, half a dozen peacocks, and many other birds that were roosting in the trees near the road. I wondered if the leopard family had also been killed in the fire. The thought was very depressing.

Two days later, a leopard was seen near a village a mile away from the burnt forest. The report in the newspaper said people were in panic; the leopard had let loose a reign of terror; and no one ventured out after dusk. To me the lines seemed to be straight out of Jim Corbett's 'Man-eating Leopard of Rudrapur'; the tale of a leopard that operated a hundred years ago, in an area four hours' drive from Dehradun. I visited the village, for it was not far from my house. People were amused: where else would a leopard live, if not in the forest? They asked. The leopard had caused them no harm. I did not find them in panic; they were used to the presence of wild animals in their neighborhood.

That night this patch of forest also was burnt down. The fire had caused extensive damage to the forest. A few days later, there was yet another sighting of a leopard; this time it was four miles away from the spot where a leopard had been last reported. As before, the report described people living in panic and suffering from the reign of terror caused by the leopard in the area. Once again the forest was burnt.

Then all of a sudden leopard sightings stopped; peace returned. But it was the lull before the storm. The world famous Wildlife Institute of India is just half a mile from my house. The land on which it stands was once a forest, linked with the forest behind my house. Over the years, the links were severed; clusters of houses mushroomed in the spaces along the edge of the forest. A high wall around the Institute now protects a small patch of forest on its estate. A small spring-fed stream flows in it through tall wild grasses, shrubs and trees. It is like a safe heaven for many wild animals of the erstwhile forest; monkeys, hares, jackals, peafowl, jungle fowl, partridges, snakes, tortoises, mongooses live in it; leopards are known to visit it, but they do not stay for long. The beleaguered leopardess arrived with her two cubs, and decided to stay in it for the time being.

The forest she had taken shelter in did not have enough prey in it to feed her family. She started picking up stray dogs and small animals at night from the villages around. One day a dog killed by her was found snagged on the sharp hooks of the boundary wall by the workers in the Institute. It made her presence on the campus known to everyone in the Institute. Now everyone was on the lookout for the leopard. It was not long before she was sighted by the people. She was seen accompanied with her two cubs in the forest behind the students' hostel.

Safety of human life was a hot topic for discussion; but there was a difference. The discussions did not stop at human safety concerns; the protection for the leopard and her cubs also was a part of concern of the human minds. Opinions were split over how to deal with a leopard mother and her cubs. Some argued her presence was a normal event; for leopards had been seen on the campus even on earlier occasions. She would shift out in due course of time, they held. Others feared human backlash if any one was attacked or injured by the mother in defense of her cubs. They favored capture of the leopards and their release in a far-off forest.

Some workers on the campus tried to drive them away early one morning; and a boy was mauled by the leopard on the campus of the Institute. The news of the leopards living in their midst was unwelcome; nobody wished leopards to live near them. If the Director did not take any action and

let people take the matter in their hands, the fate of the leopards was sealed. He decided to take the help of the forest department. Traps were set up at the leopards' favorite haunts. The dense undergrowth of bushes was cleared for better safety of human life. But all efforts came to a futile end.

Providence intervened, and a light, pre-monsoon rain fell; the parched forest lapped up the rain drops thirstily. Sap rose in the dry grass-blades and comatose stems of bushes. Fresh green buds burst out on skeletal plants; the sparse tangles of lantana bushes became dense. The forest became a better place for the wild animals. The cubs had grown up, and were more mobile now. When the people in the Institute tried to drive away the leopards, they moved back to the forest where I had seen them earlier.

But they could not stay there: the prey was missing. The leopards moved on to an unknown part of the forest.

The mother was still on the run for life – hers as well as of her cubs'. Whether the mother found a safe heaven for her cubs or not, I do not know. But she left behind some questions for us to answer.

*

The summer months of April and May turned out to be a reporter's delight. Fires kept on burning up the forests and wildlife in the state of Uttarakhand. Displaced by fires and driven by hunger, wild animals came closer to the human habitation to escape from fire and in search of food. The specter of terror raised its wicked head where ever leopards were sighted. The sensitive reporter did not suffer from dearth of space for his news in the local dailies.

People wanted to know why leopards were coming to their villages; what was the forest department doing about it? The increase in leopard population was the root cause of the problem, some said. A villager opined that the population of leopards had actually decreased; and now the forest department was breeding them in the Corbett National Park and releasing them in the hills. Forest officers believed it was the impoverished prey base that drew the leopards to scavenge for food at the dumps of garbage near villages; and lift a dog, or a goat, or a fowl for a bonus. The leopards were hungry; they attacked goats and dogs in the villages; and, sometimes, even children.

The forest department placed traps to catch and shift the leopards from the trouble spots and appointed hunters to shoot down leopards that were dangerous for human life. Success came, but on very few occasions, and took its time; and the delay made people impatient. People needed instant relief from the threat they perceived from the leopards, and tried to take direct action of their own. When a cornered leopard tried to break through a cordon of agitated people, people were hurt; and sometimes the leopard paid with its life. Skins of slain leopards found their way into the clandestine trade in wildlife. In a short span of time more leopards were declared dangerous to human life than the number of man-eaters Jim Corbett shot during his entire life time; that too, at a time when for every one leopard today there were ten in the forest during his time.

**

Leopards were held responsible for the death of 203 human beings in ten years after the creation of the new State; and in just the last three years of the decade, 209 leopards were reported to have died an unnatural death. Dead leopards are not easy to find in a hilly terrain; how many went unreported is not known. Leopards suffered more at the hands of the people, but humans made it sound as the fault of the leopards.

In the latter half of the decade there has been a spurt in encounters between people and wild animals. Each of the areas where encounters took place touched forest cover in which leopards could hide. The real question is why did they start creating problems for the people living near such areas?

Some people explained there had been an increase in the population of leopards; more the number of leopards, more were the sightings. It is not confirmed by evidences on the ground. Pugmarks and scats of leopards should be found in profusion all over the forest if their population is

so high as to exceed the capacity of the forest to hold them in; but it is not so in the forests in Dehradun.

Scarcity of food can bring the leopard from the forest to hunt dogs and cats and other animals near village dumps. People do not spare a chance to kill an animal for the pot. Large tracts of scrub and hill forest are under stocked in food for the leopards; inevitably driving them to hunt for food in and around the villages.

Wild animals do not want any disturbance to their natural way of life; they do not relish the presence of human beings near them. Human presence and activities disturb them and stress them with a sense of insecurity; and they try to move away from the source of stress. If an area is under intense human visitation, all those animals that do not adjust to the change suffer from great stress. Breeding animals with their young ones are most sensitive to such stresses. Whether a leopard will stay in, or stray out of the forest is determined by how secure it feels in its native forest.

The leopard of the hills and scrub is smaller in size than those found in the forests of the plains; just as the cows and goats of the hills are smaller than those in the plains. Many hunters treated them as two different races; they used the term panther for the larger one and leopard for the smaller one. The terms used in the vernacular were '*tendua*' for the former, and '*baghera*' for the latter; with the common term '*guldar*' meaning the leopard in general. They believed the panther was similar in its habits and habitat to a small tiger; it has the same prey selection and hunting techniques as the tiger; and it lived in the forest where tigers, sambhar and cheetal lived. On the other hand the smaller leopard hunted small prey, such as the barking deer, monkeys and pheasants found in scrub forests. It often ventured close to human habitation and scavenged on the waste dumps; and given a chance it picked up dogs and small goats from under the very nose of the human beings. However, the two are known to biologists as one and the same species of the big cat called *Panthera pardus*.

Dehradun, where the incidents I have narrated took place, is nestled in a broad valley that separates the Siwalik Hills from the Himalayan Range. Both large and small leopards are found in it. The large ones live in the sal forest of the valley, and the smaller ones stalk their prey on the mountain side below Mussoorie. The valley was once covered with dense forest mixed with grasslands. It was a prime wildlife habitat for wildlife; not much different from the valley of Patlidun in the Corbett National Park.

The State of Uttarakhand was founded in the year 2000 AD; and Dehradun became its capital. As the city developed, tentacles of concrete and asphalt spread out in the once green valley and shred it into small, scattered bits and pieces of farms and forest. The length of the forest edge increased. Walls of brick and concrete came up where once trees stood and leopards roamed. Routes used by wild animals for moving from forest to forest have been blocked or cut up. Motorcycle borne young boys now drive along deer paths in the day and night. The forests are highly fragmented and disturbed, and have been robbed of their wild character. There is no way a leopard or an elephant can avoid coming out in the open when moving from one fragment to another in search of food and secure homes. The situation in the hills is similar, if not the same.

For the past six years I have known three leopards – two males, and a female – that moved over the splintered habitat. One of the males was a regular visitor to the Forest Research Institute at the foot of the Mussoorie hills; that has its widespread landscape covered with scattered patches of forest and bushes, in which wild pigs, hares, jackals, jungle fowl and many other wild animals live. The male leopard in the forest at the foot of the Mussoorie hills was attracted by them. He was slightly larger than a Bhotia mastiff in size. Many people saw him in the twilight of dusk, sitting on the boundary wall of a bungalow in Forest Research Institute; but he never attacked any one.

At the other end of Dehradun valley is the Siwalik range of hills. The Wildlife Institute of India came up in the 1980s on land that was once a part of the forests of the Siwalik Hills. Small patches of forest were retained in the Institute; and some remnant wildlife survived in these patches. A spring fed stream flows through it, making it a little haven for the local wildlife. It was said that a male and a female leopard from the Siwalik forests visit it from time to time.

The range of movement of the three leopards covered the fragments of the green cover that

dotted the urban landscape. But they were rarely seen. These leopards had never been involved in any attack on human beings. So, how was it that during the summer of 2010 there were so many sightings of leopards reported in the media? The leopard mother had left behind many unspoken questions for us to answer; these now came back to haunt me.

**

The fire that made the mother leopard with cubs run for her life and the life of her family was not a natural fire. There had been no thunder storm, or high wind that could have produced fire in the forest. A carelessly thrown butt of cigarette or *bidi* could have started the fire at one point but the fire appeared all of a sudden as a long row of flickering flames. Someone had set the forest on fire. The first question was: Who set her forest on fire and why?

I did not know who they were, and why they did so. So, I tried to find the answer to her question. On the land abutting the forest the crops were nearing harvest time. No one would run the risk of wind blowing the fire into their standing crops. Young boys in my village had come out of their own to help the forest department put out the raging fire. They could not have been the ones to set fire to the forest. Who else would commit such a horrific act?

A tall, slim, middle-aged man had hurriedly walked out of the forest just after the fire appeared on the rim of the nullah. He caught my attention because he was wearing a full sleeved striped shirt and a dirty white pyjama, a dress not worn by the local villagers. I thought he might have seen the leopard while collecting firewood and I did not pay him much attention. Was he the one who had set fire to the forest?

People in my village let their cattle loose to pasture in the grassy banks in the forest. They also fetched back firewood and fodder from the forest for use at home. The only animal they were over awed by was a solitary tusker who gave them a feeling that the village had come up on his land; and that he was the lord and they his subjects. He levied his tax on them for the use of his land, once in a year; but he never hurt any one. I had, by choice, built my house at the edge of the forest. The day after I had demarcated the boundary of my plot of land, I found it circumscribed by a neat trail of his foot prints. He had come to inspect the site in the dead of night. And he seemed to have allowed me, with his blessings, to live there on his land. He did not disturb me over the following three years of my living on his land. I had been taking walks in the forest: but the forest never seemed a frightening place to me; or to the people in my village.

There were others around who had an innate dread of the jungle. For them it was a place for spirits and ferocious animals. Most of them never entered the forest, for they were not dependent on the forest for their livelihoods.

Yet there were those who did not live near the forest; but they regularly entered the forest. Small groups of old men and women went into the forest early in the morning, carrying sickles and axes and cords with them; where they cut up fallen trees and made bundles of firewood for sale in the town. All day they streamed out of the forest, carrying head-loads of firewood to the near by bakeries and low price tea and food stalls that line the road to Dehradun. They spent time in the forest and were not afraid of the wild animals.

During the rainy season old rotten branches fall to the ground; swollen watercourses bring down trees grown on their banks. There is ample supply of dead, dry and fallen firewood on the ground in the forest. But it soon declines as it is taken out and sold in the market. The axe seeks logs and the stumps of trees, which are converted into splits of firewood and sold in the town. But it, too, does not last long. The forest grows a new generation of trees and shrubs every year; the firewood cutters know how to convert them into firewood. They remove the bark of trees and young saplings, and leave them standing to die. Soon these are dry and ready for removal as dead wood. Naturally dead and fallen firewood is crooked in form, and varies in thickness and length; but very long and straight firewood comes from the young trees that were cut and left to dry in the forest. Each head load of eight to ten feet long sticks is made of fifteen to twenty future trees. With the advance of summer this supply, too, dwindles out. By the time summer advances to its peak the forest is

exhausted of all dead and dry firewood. The forest is then set on fire to quickly dry out the green bushes and take out their thin branches for sale in the market.

This is also the time when the young of wild animals are at their most vulnerable age. Most of the wild animals bring their young into this world just before nature produces food for them; which is when spring meets summer. This is the time when mothers are bringing up their little ones. Peacocks, jungle fowl, partridges, pheasants, deer, wild boar, bears, leopards, tigers, and all other animals that live on the ground or in the trees are with their young. Fire displaces them, kills them, and destroys their food and shelters. Survivors try to seek shelter in less disturbed cover, and sometimes come close to the edge of the forests.

The woodcutters had set the forest on fire, only for earning their daily bread. These people are the poorest of the poor; but they are absolutely unconcerned about the death of animals in the forest; and they could not care less what happened to a mother and her babies. Poverty and hunger can not promote soft sentiments for wildlife in their minds; they have to face a harsh and ruthless world of human beings.

We have voices that relate their actions with their poverty and livelihood issues; but ignore the ruin of a forest ecosystem. The outcome of such actions is not even recognized, much less discussed. The shift of human thought from sustenance needs to greed for riches is not unknown. It is a small step for the people to take from wood collection to meat collection or hunting animals for the market; poaching for international market is the next step.

Perverse inane violence is an attribute of only the human society; it is not a trait of the world of wild animals. Why do our scribes demean the Law of the Jungle when they brand riots, arson, and massacres as the law of the jungle? What do we know about the Law of the Jungle?

Food, space, mates and security are the basic needs of life; people as well as wild animals value them. No one is rich or poor in the jungle. Health means Life; Life feeds on Death; Death begets Life. There is no place for senseless killings in the Law of the Jungle. The deer knows when a tiger is satiated and will not attack it. There is no place in it for jealousy, ego, greed or anarchy.

Kindness and concern for the others are not unknown in the jungle. Many strange happenings have been seen taking place in the wilds. A lioness adopts an antelope fawn in Samburu Reserve in Africa, not once but seven times; a leopard adopts a young one of a baboon; a hippo fights with a crocodile and snatches away a young antelope to save its life – and takes it to the bank of the river, where it tries to gently coax the antelope up on its legs. Back home, at Antoli, a village near Vadodara in Gujarat, a wild leopard visited regularly its childhood friend, a cow, and spent hours playing with it till dawn, in full view of the dumbfounded villagers.

The Law of the Jungle grants both human beings and wild animals the right to live. The Law of Man respects the right of murderers and criminals among human beings to live; they are tried first in the court of law, and not summarily awarded a death sentence. But when it comes to the trial of a wild animal, even the innocents do not have any right to live; they are awarded death sentence without a trial. Why do people torture and kill a hapless elephant calf separated from its mother, torch alive a Himalayan black bear, or beat a wild animal to death?

The leopardess was forced to leave every forest where she had tried to take shelter. It was summer when the fire in the forest forced the mother leopard to shift her cubs and exposed her to the people. She did not try to come near human habitation during the rainy season or the winter months. She did not harm anyone, why did people become her enemies? Didn't she have a right to raise her young ones in her natural home? The forest where she lived seemed to echo her questions. Who will answer the mother leopard's unanswered questions?

I struggled to answer the question but could not. All I could think of was that we are too far removed from the ethics of life. Every one of us – the professional forester, the media, the politician, the town planner, the local householder – has to revisit our preformed notions about man and wildlife and work together, in an enlightened manner, to change the situation for the better. Otherwise, like the tiger, the leopard is also heading towards extinction, and we are jointly responsible for it.

DEMOGRAPHIC STUDY OF ASIATIC ELEPHANTS IN NORTH INDIA

*Dr. K.N. SINGH

In the sixties the press reported that the elephant population in erstwhile U.P. has grown out of proportion. When, in fact, in undivided U.P., elephants were fighting for their survival. It was a time when Nepal started clearing a very wide strip of forest adjoining the North Indian border for habitation. Most of this area was the habitat of elephants that migrated frequently across the international boundary. Today many people will be surprised to know that Dudhwa National Park was actually a habitat for elephants before the sixties. It is reported that a herd of about 30 wild elephants visited the campus of Dudhwa forest rest house during July 1964 (Singh K.N.) and returned to their habitat in Nepal. A herd of 23 elephants strayed into the forests of North Kheri Forest Division on 23rd Dec., 1975 (Singh V.B., 1978). After this, authentic records on elephants visiting Dudhwa National Park up to 1986 are not available. Picking the story from the early sixties it may be recalled that then there was a persistent public demand for reduction of the number of wild elephants in erstwhile U.P. the government had to yield and permits were issued for killing of elephants. As many as 27 elephants were killed and 12 were reported to have been wounded. This happened at a time when the U.P. elephant population was dwindling. There were no authentic records of their numbers, but conservationists pressurised the Government that declaration of martial law for elephants was not warranted and decision about the fate of the elephants should be taken on the basis of census of their population. Accordingly, in 1966 the first elephant census was carried out in UP and repeated in 1967. (SINGH V.B.1967) Since then, elephant census has been carried out periodically and results are given in the following table.

Table 1.01
Total Count of Elephant Census

Year	Total Elephant Population	Male	Female	Calf
1967	380	112	180	88
1976	507	144	239	124
1986	769	205	350	214
1991	1010	270	467	273
1992	1069	298	507	264
1993	1297	362	628	307
1995	1572	451	750	371
1997	1675	424	783	468
1999	1945	524	908	513

*RETIRED PRINCIPAL CHIEF CONSERVATOR OF FORESTS U.P. (INDIA)

With the bifurcation of the state into Uttar Pradesh and Uttarakhand on 9th November 2000 the population statistics is as follows:

(a) Uttarakhand- Total count of elephant Census.

Year	Total Elephant Population	Male	Female	Calf
2001	1507	N.A.	N.A.	N.A.
2003	1582	N.A.	N.A.	N.A.
2005	1510	281	682	547
2007	1346	316	716	314

(b) Uttar Pradesh- Total count of elephant Census.

Year	Total Elephant Population	Male	Female	Calf
2001	143	N.A.	N.A.	N.A.
2003	144	N.A.	N.A.	N.A.
2005	161	57	70	34
2007	380	113	180	87

(b) North India- Total count of elephant Census.

Year	Total Elephant Population	Male	Female	Calf
2001	1650	N.A.	N.A.	N.A.
2003	1726	N.A.	N.A.	N.A.
2005	1671	338	752	581
2007	1726	429	896	401

Graphically the populations can be depicted as follows:

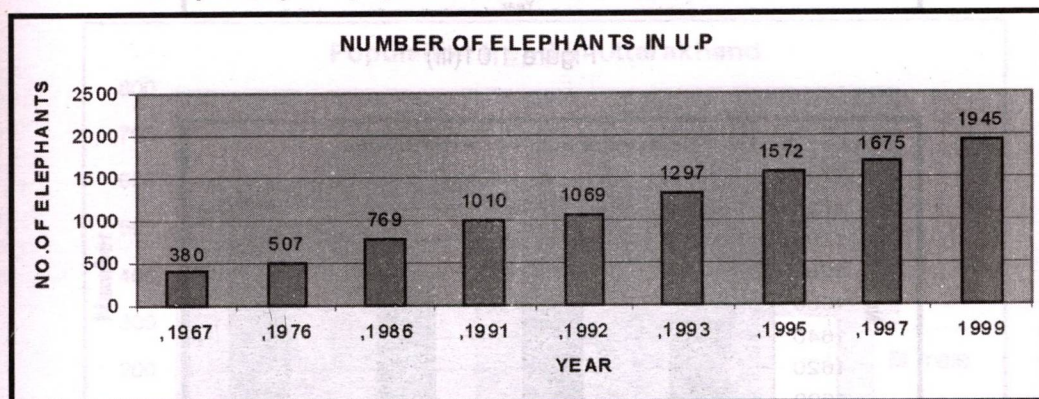


FIGURE 1.01(i)

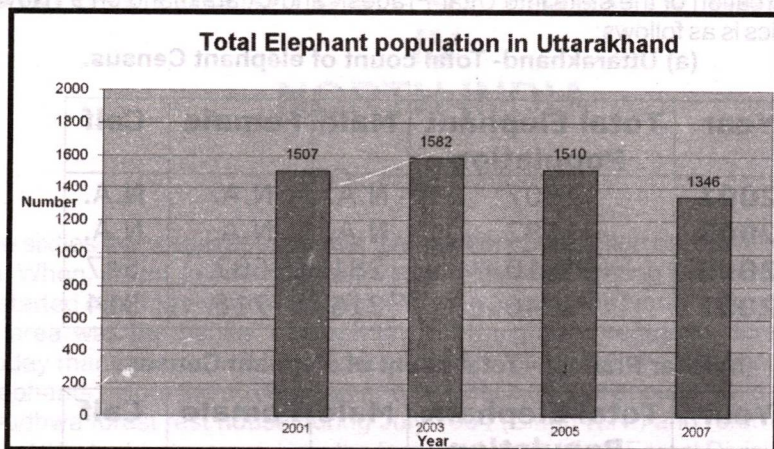


Figure 1.01(ii)

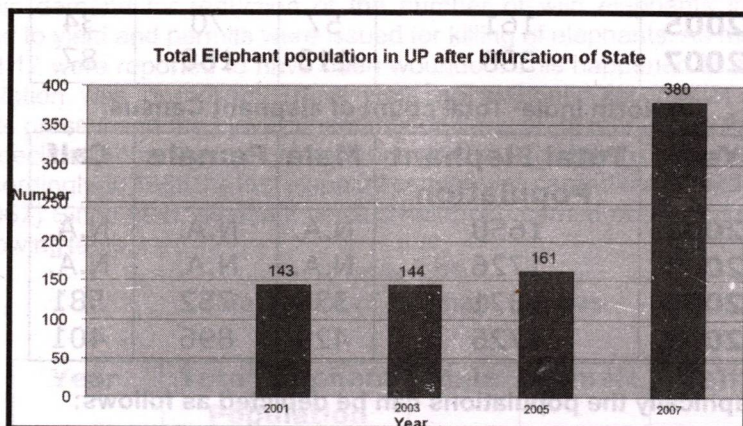


Figure 1.01(iii)

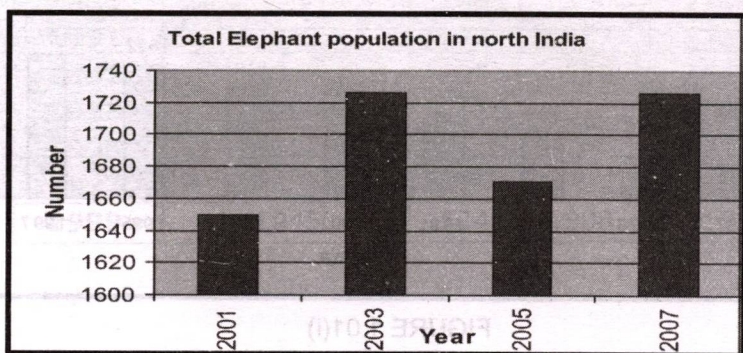


Figure 1.01(iv)

De Roopak (2010) Additional Principal Chief Conservator of Forest, U.P. Ex Field Director, Dudhwa Reserve has observed "the reports of elephant populations in Katarniya Ghat Wildlife Sanctuary, Bahraich in 2009 are also indicative of transmigration of elephant populations across the Indo-Nepal border."

The population figures show a growing trend with a fair number of calves being recorded both in UP and Uttarakhand. The figures of 2007 show a sharp increase in the number of calves being reported from UP and a drop in numbers being reported from Uttarakhand. This could be as a result of movement of populations from Uttarakhand to UP in that period. The population of elephants do not acknowledge the political divider by humans.

1.02 POPULATION DYNAMICS TRENDS-

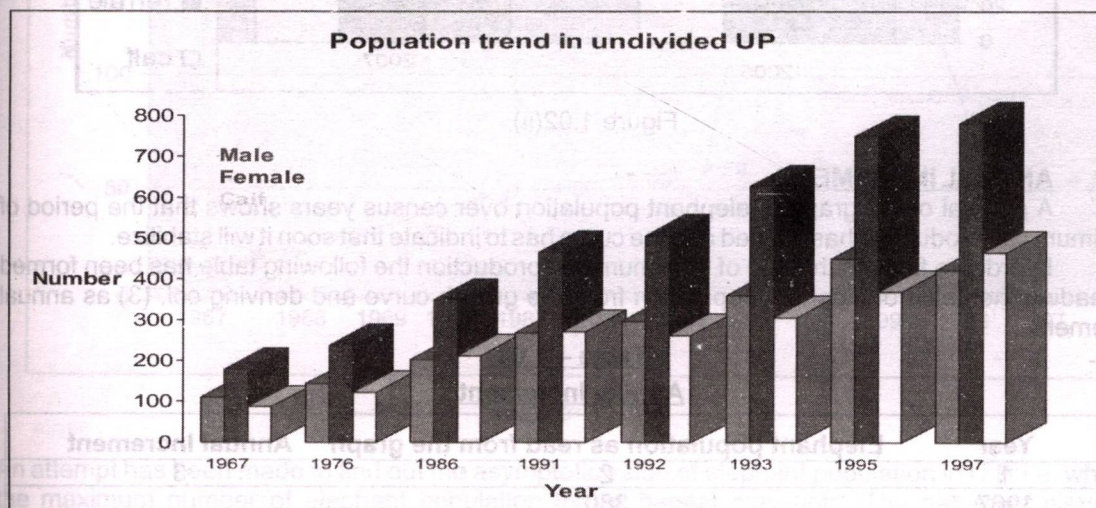


Figure 1.02

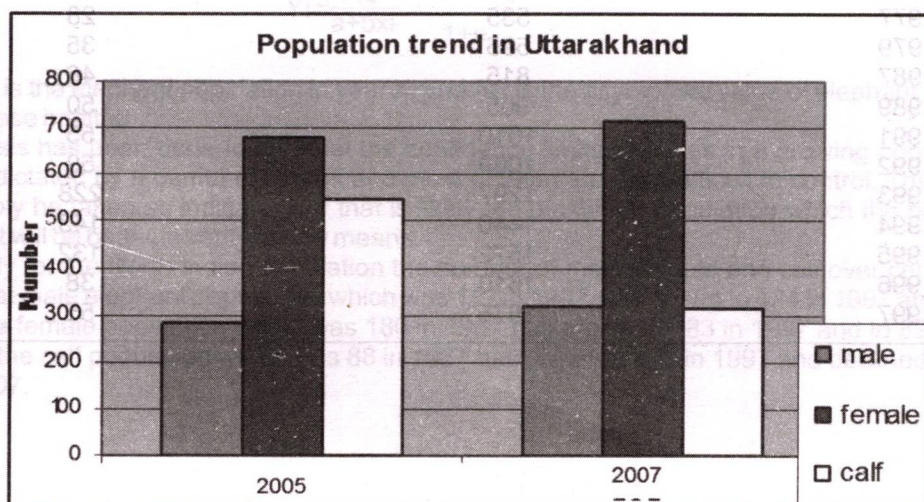


Figure 1.02(i)

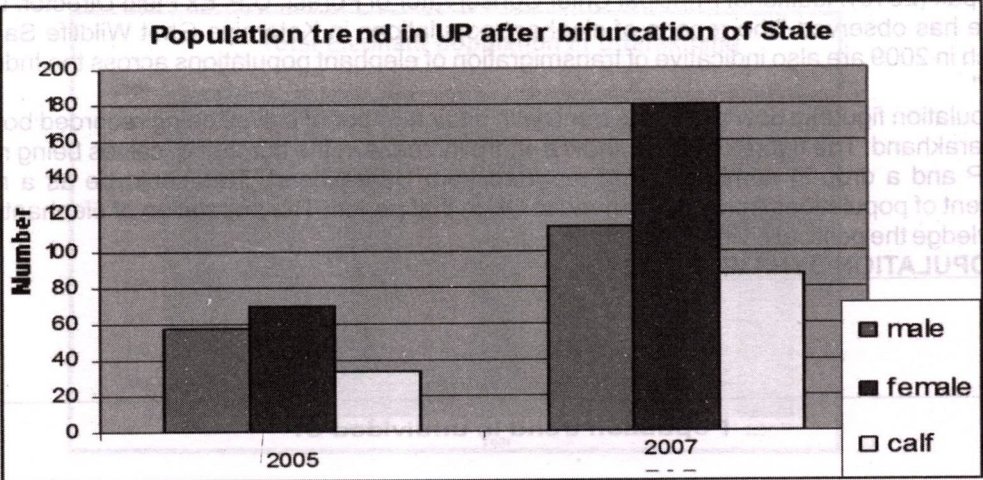


Figure 1.02(ii)

1.03 **ANNUAL INCREMENT-**

A perusal of the graph of elephant population over census years shows that the period of maximum calf production has passed and the curve has to indicate that soon it will stabilize.

In order to find out the age of maximum calf production the following table has been formed by reading the value of elephant population from the growth curve and deriving col. (3) as annual increment.

Table – 1.03
Annual Increment

Year	Elephant population as read from the graph	Annual Increment
1	2	3
1967	380	
1968	395	15
1969	410	20
1977	535	28
1979	595	35
1987	815	46
1989	905	50
1991	1010	55
1992	1069	59
1993	1297	228
1994	1440	143
1995	1572	132
1996	1610	38
1997	1675	55

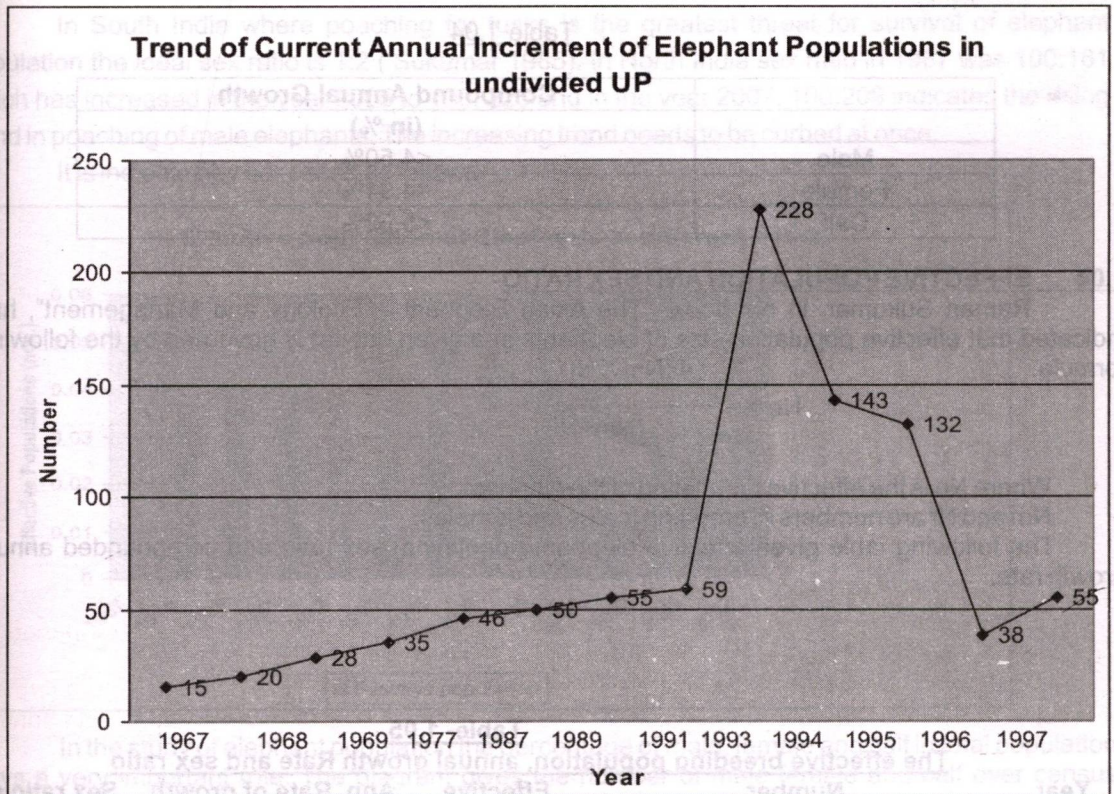


Figure- 1.03

An attempt has been made to find out the asymptotic value of elephant population in U.P. i.e. what is the maximum number of elephant population that a habitat may hold. The nature of elephant population curve suggests that is of the type as follows.

$$Y_i = \frac{AO}{1 + e^{a+bx_i}}$$

Where Y_i is the elephant population in year X_i and AO is the asymptotic value of elephant population in both these habitat.

No analysis has been done to arrive at the confidence limits of AO as in a growing population the future is dictated by a gamut of factors and most of them are very difficult to control. Therefore AO may simply be taken as indicator low that is likely the maximum population which the habitat may support. It will be better to verify this by means.

Holistically for the North Indian population the number of male, female and calf over census years shows that male elephant population, which was 112 in 1967, has grown to 424 in 1997 and to 429 in 2007. The female population which was 180 in 1967 has grown to 783 in 1997 and to 896 in 2007. Similarly the calf population which was 88 in 1967 has grown to 468 in 1997 and declined slightly to 401 in 2007.

Table 1.04

	Compound Annual Growth
	(in %)
Male	<4.50%
Female	<4.91%
Calf	<5.52%

1.04 EFFECTIVE POPULATION AND SEX RATIO-

Raman Sukumar, in his book, "The Asian Elephant – Ecology and Management", has indicated that effective population size of elephants in a given habitat is governed by the following formula.

$$4 (N_m \times N_f)$$

$$N_e = \frac{4 (N_m \times N_f)}{(N_m + N_f)}$$

Where N_e is the effective population of the elephant.

N_m and N_f are numbers of breeding males and females.

The following table given effective elephant population, sex ratio and compounded annual growth rate.

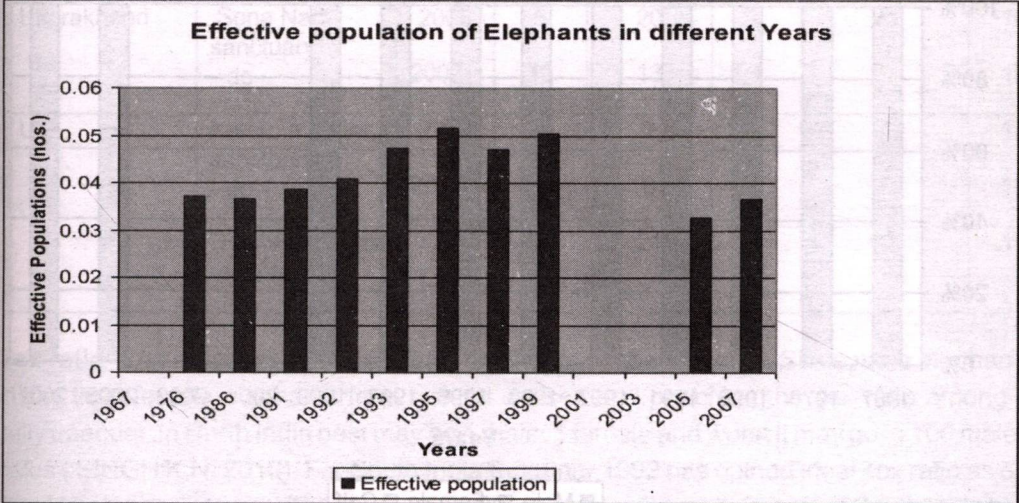
Table- 1.05

The effective breeding population, annual growth Rate and sex ratio

Year	Number				Effective population	Ann. Rate of growth in % with 1967 as base year	Sex ratio per hundred Male
	Male	Female	Calf	Total	Total count	Effective Population	
1967	112	180	88	380	276	-	100:161
1976	144	239	124	507	383	3.3%	100:166
1986	205	350	214	769	546	3.8%	100:171
1991	270	467	273	1010	684	4.2%	100:173
1992	298	507	264	1069	750	4.2%	100:170
1993	362	628	307	1297	919	4.8%	100:173
1995	451	750	371	1572	1127	5.2%	100:166
1997	424	783	468	1675	1100	5.1%	100:185
1999	524	908	513	1945	1329	5.2%	100:173
2001				1650			
2003				1726			
2005	338	752	581	1671	932	4.0%	100:223
2007	429	896	401	1726	1160	3.9%	100:209

(a) In South India where poaching for tusks is the greatest threat for survival of elephant population the ideal sex ratio is 1:2 (Sukumar 1985). In North India sex ratio in 1967 was 100:161 which has increased in the year 2005 to 100: 223 and in the year 2007, 100:209 indicates the rising trend in poaching of male elephants. The increasing trend needs to be curbed at once.

(b) It is indicated by bar charts as follows-



In the study of elephant population the percentage of male, female and calf in total population plays a very important role. The diagram gives the number of male female and calf over census years.

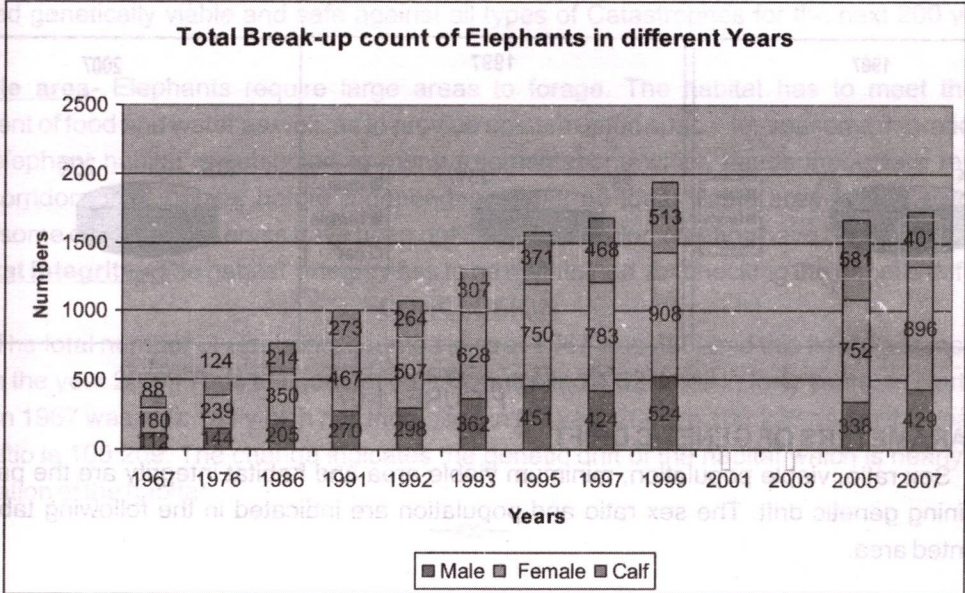


Figure-1.05

The same can be depicted in terms of percentages as follows:

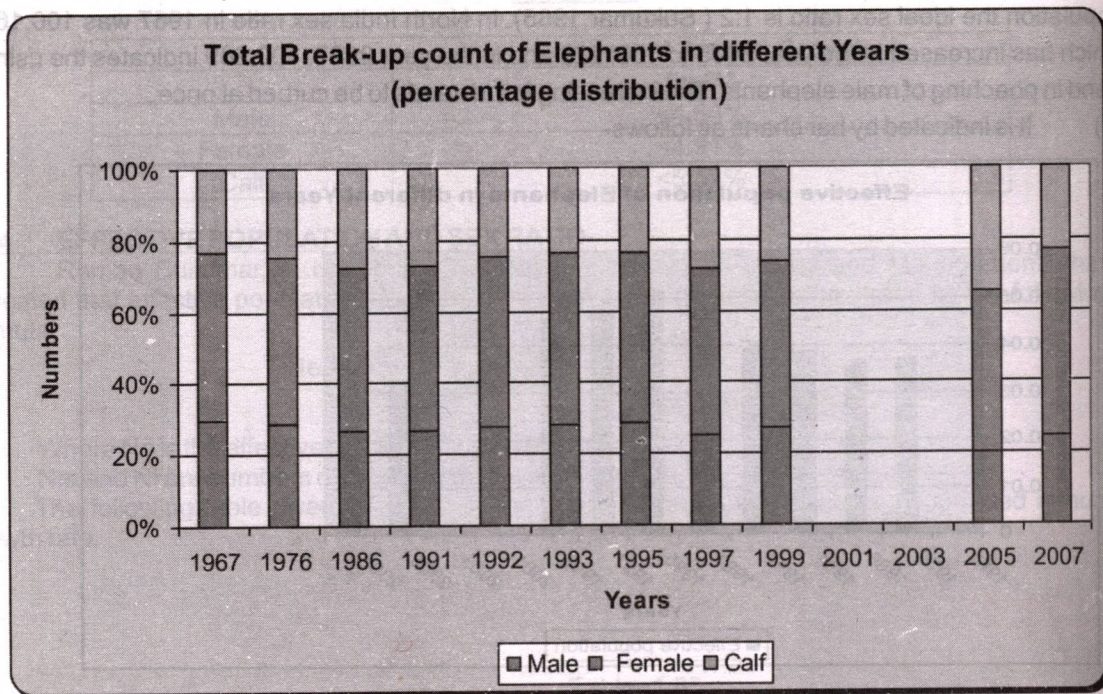


FIGURE- 1.06

Pie chart showing percentage of male, females and calf population in 1967, 1997 and 2007 clearly bring out the fact that calf population increased.

Pie Chart

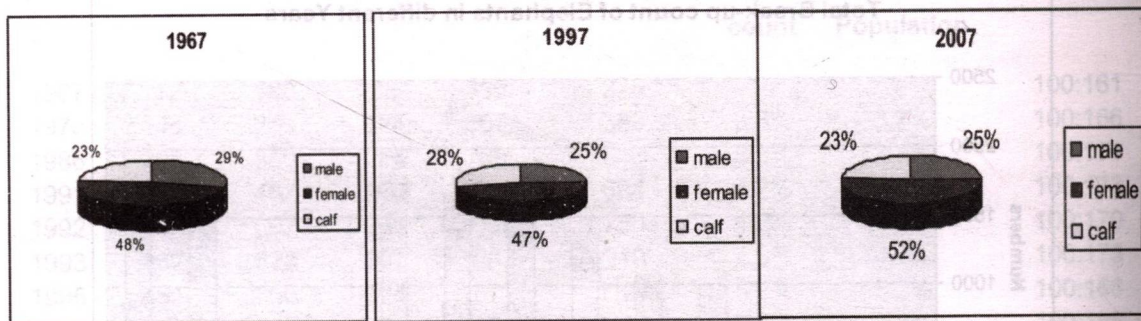


FIGURE- 1-07

1.05 PARAMETERS OF GENETIC DRIFT

Sex ratio, viable population, minimum viable area and habitat integrity are the parameters determining genetic drift. The sex ratio and population are indicated in the following table for the fragmented area.

TABLE- 1.06

State	Name of sanctuary	Year	Male	Female	Calf	Total population	Sex ratio
1	2	3	4	5	6	7	8
Uttarakhand	Sona Nadi sanctuary --do--	2005	6	20	-	26	100:200
		2007	10	13	4	27	100:150
U.P.	Katernia Ghat sanctuary --do--	2005	1	2	-	3	100:200
		2007	2	3	2	7	100:150
	Dudhawa Tiger reserve		4	21	7	32	100:522

(i) **Sex ratio-** The most important issue for elephants is the sex ratio. Since male elephants suffer mortality than female elephants from natural causes and poaching the sex ratio among adults is usually unequal. In North India best may be 1 male: 1 female and worst it may go to 100 males for 150 females (SINGH K.N. 2010). For South India Sukumar 1992 has opined ideal sex ratio as one male for two females and at worst it may go up to 1:20 or even more as in forests of South India because of more frequent incidences of poaching. The more unequal sex ratio, the higher is the rate of genetic drift. A perusal of data in table 1.05 reveals that year wise ratio for North India varies from 100 males per 161 females to the worst situation in 2005 to 100 males for 223 females. The effort has to bring the ratio of 100 males per 150 females.

(ii) **Viable population-** According to Wild life experts on elephants 50 breeding individuals are considered genetically viable and safe against all types of Catastrophes for the next 200 years at best.

(iii) **Viable area-** Elephants require large areas to forage. The habitat has to meet the daily requirement of food and water as well as to provide uninterrupted space for seasonal migration. The present elephant habitat is subjected to many fragmentations which needs immediate repair by making corridors. The habitat before Independence was an ideal viable area for the elephants. Recently some elephant Reserves have been notified and corridor creation have been made.

(iv) **Habitat integrity-** The habitat integrity has to be maintained for checking the genetic drift.

CONCLUSION

The total number of elephants counted in year 1967 was 380, and this figure has increased to 1726 in the year 2007. Thus the population has multiplied 4.52 times in forty years. In North India sex ratio in 1967 was 100: 161 which has increased in the year 2005 to 100:223 and in the year 2007 the sex ratio is 100:209. The change indicates the genetic drift of the habitat which is nearly due to fragmentation of the habitat

ANTLERS AND HORNS OF THE INDIAN UNGULATA – A REVIEW

*Y.C. Rai

SUMMARY

With a view to acquaint and apprise the younger generations, and particularly that of forest officers, about the rich diversity of Indian Ungulata during the last one hundred and fifty years, this article sums up their present systematic classification, anatomy of antlers and horns of 28 separate species of Cervidae and Bovidae from India and the records of their maximum sizes reported by various naturalists during this period in respect of their lengths along the outer curve, circumference at base, tip to tip measurements, both in the F.P.S. as also in the metric system, and their points. Pictorial diagrams have also been given for easy identification. In the present context of deteriorating forest cover, and consequently the depleting fauna therein, these are indicative of our lost heritage.

INTRODUCTION

Last half of the nineteenth century, and the first half of the twentieth century had witnessed the palaces, mansions and even houses of common people in our country being decorated with a number of mounted trophies of wild animals having antlers and horns belonging to the two families Cervidae (Deer) and Bovidae (Horned Ungulata) within the Infra Order Pecora of the Sub Order Ruminantia belonging to the Order Artiodactyla, commonly known as Ungulata or the hoofed animals. However, with the onset of the second half of the last century, such interest appears to have waned with the passage of time. And today, when even the very existence of forests has been threatened with extinction, thanks to the controversial Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, it now appears to be only a matter of time, when what to say of horns and antlers, the entire wild life of all hues is likely to be wiped out at not too distant a date.

Since the present band of the so called environmentalists and wild life experts who very often speak with the voice of authority on wild life in various fora, even though some of them might never have been inside a real forest even once, or at best might have gone there as a casual tourist, together with a number of N.G.O.s run by them for various reasons, have singularly failed to check the decimation of wild life, it is high time when we, of the older generation of forest officers, who had just a glimpse of what we had lost by that time, and are luckily still alive, are duty bound to present before the present and future generations of forest officers, and other naturalists the richness and diversity of wild life as it had existed within just a century in our country. This will require a closer examination of these ungulates that had occurred in those days, with special reference to their ornamental head pieces that were sought after so avidly by sportsmen of yesteryears.

SYSTEMATIC CLASSIFICATION:

A total of twenty eight feral ungulates described in this article are the ones that have been reported from the Indian sub continent, although today quite a few of these are almost on the verge of extinction or have already reached a critical stage. Domesticated cattle, sheep and goats have been excluded from the purview of this article.

The Ungulates bearing antlers and horns have been subdivided as under as per the classification followed in Grzimek's Animal Life Encyclopedia, Vol. 13 (IV), 1972.

FAMILY CERVIDAE

Subfamily:	Muntiacinae
Genua:	Muntiacus
Species:	Muntiacus muntjak (Zimmerman 1780)

- KAKAR
- Subfamily: Cervinae (True deer)
- Genus: Axis
- Subgenus: (Axis porcinus (Zimmerman 1780))
- PARA
- Subgenus: (Axis axis (Erxleben 1777))
- CHITAL
- Genus: Cervus (Red deer)
- Subgenus: Rusa
- Species: Rusa unicolor (Kerr, 1792)
- SAMBAR
- Subgenus: Rucervus
- Species: Rucervus duvacellii (Cuvier 1823)
- BARASINGHA
- Species: Rucervus eldi (M'clleland, 1842)
- THAMIN
- Subgenus: Cervus
- Species: Cervus elaphus affinis (Hodgson, 1841)
- HANGUL
- FAMILY: BOVIDAE (Horned Ungulates)**
- Subfamily: Bovinae
- Tribe: Boselaphini
- Genus: Boselaphus
- Species: Boselaphus tragocamelus (Pallas 1776)
- NILGAI
- Tribe: tetracini (Four horned antelopes)
- Genus: Tetracerus
- Species: Tetracerus quadricornis (de Blainville 1861)
- CHAUSINGHA
- Genus: Babalus
- Species: Bubalus arnee arnee (Kerr 1792)
- ARNA
- Genus: Bos
- Subgenus: Bibos
- Species: Bibos gaurus gaurus (H. Smith 1827)
- GAUR
- Species: Bibos gaurus frontalis (Lambert 1804)
- GAYAL
- Subgenus: Poephus
- Species: B. (Poephus)_grunniens (Linne 1766)
- YAK
- Subfamily: Antilopinae
- Tribe: Gazellini
- Genus: Gazella
- Subgenus: Gazella
- Species: Gazella bennettii (Sykes 1831)
- CHINKARA
- Genus: Procapha
- Species: Procapha picticaudata (Hodgson 1846)
- GOA (TIBETAN GAZELLE)

	Tribe :	Antilopini
	Genus:	Antilope
	Species:	Antilope cervicapra (Linne 1758)
	-	<u>BLACKBUCK</u>
Subfamily:		Saiginae
	Genus:	Panthalops
	Species:	Panthalops hodgsoni (Abel 1826)
		<u>CHIRU (TIBETAN ANTILOPE)</u>
Subfamily:		Caprinae
	Tribe:	Naemorhaedini
	Genus:	Nemorhaedue
	Species:	Nemorhadus goral (Hardwicke 1825)
	-	<u>GORAL/ GHURAL</u>
	Genus:	Capricornis
	Species:	Capricornis sumatransis (Bechestein 1799)
	-	<u>SEROW</u>
	Tribe :	Budorcatini
	Genus:	Budorcas
	Species:	Budorcas taxicolor (Hodgson 1850)
		<u>TAKIN</u>
	Tribe:	Caprini
	Genus:	Capra
	Species:	Capra falconeri (Wagner 1839)
	-	<u>MARKHOR</u>
	Species:	Capra ibex siberica (Pallas 1776)
		<u>ASIATIC IBEX</u>
	Genus:	Hemitragus
	Species:	Hemitragus jemlahicus (H. Smith 1826)
	-	<u>HIMALAN THAR</u>
	Species:	Hemitragus hylocrius
	Or	Nilgiritragus hylocrius (Ogilby 1838)
	-	<u>NILGIRI TAHR</u>
	Genus:	Pseudois
	Species:	Pseudois nayaur nayaur (Hodgson 1833)
		<u>BHARAL OR HIMALAYAN BLUE SHEEP</u>
	Genus:	Ovis
	Species:	Ovis ammon hodgsoni (Hodgson 1833)
		<u>NYANG</u>
	Species:	Ovis ammon poli (Blyth 1841)
		<u>GREAT PAMIR SHEEP</u>
	Species:	Ovis orientalis (Gmellin 1774)
		<u>PUNJAB URIAL</u>

ANTLERS

These occur only amongst the members of Cervidae.

The word 'antler' appears to have been derived from the old French term 'antoiller', which is probably a variation from Latin 'antocolorum' (before the eyes), that was originally applied to that branch of antlers that descended over forehead, known as brow tine. Subsequently the term covered the entire formation that we know today as 'antlers'. Usually the shaft of the beam of each antler carries three tines on its lower front edge. The lowest is known as brow-tine, the middle one, the bez-tine and the end one, the trez-tine. The top of the beam may either be divided into these three tines or may be split

up in several smaller tines radiating outwards. There can be more variations in their shapes and sizes depending upon the individuals genetic or ecological differences.

In addition to these being usually branched, their outer surface is rough and is not covered by any skin or horn. It is just a mass of dead bone for a certain period every year. These arise from a pair of shorter or longer bony pedicels situated on the skull, above and behind the eyes, and form a part of the skull.

In young deer and some of the smaller forms, the growth of antlers is limited to the formation of a single spike with just one fork. But in adults, these get more complicated into several tines that formally take the shape of complete antlers. As the tines go on increasing, a deposition of bony matter takes place at its base, just above the point of union with the pedicel of the skull in the form of distinct ring or 'burr'. This ring goes on constricting the blood supply of velvet and finally dries up the same. At this stage, the antlers are fully developed, which period normally coincides with the rutting and pairing season and the animals normally use their antlers as efficient weapons for protecting or augmenting their 'harems'. Occasionally these are also used to ward off attack from predators, enemies, conspecifics or others, and even human beings.

Antlers are found in males of all Cervidae except the mouse deer and the Chinese water deer that are primitive species. The reindeer of the Arctic region have antlers on both the sexes. Antlers are usually curved or lyre shaped that end with six, seven, eight or even more points varying in different individuals of the same species.

MODE OF GROWTH OF ANTLERS

The growth of antlers is initially in the form of velvet covered knobs about one to two months after the last year's antlers have been shed. After about two weeks, a branching pattern appears. After another two weeks or so, the antlers get well developed but are still covered with velvet, which is a soft and vascular skin, clothed in exceedingly fine hairs, through which blood flows. This is shown in Plate – 1. Their growth goes on for about three months after which the velvet starts to dry for reasons explained above. When the bony material gets fully hardened, the velvet starts flaking, and falls off through the process of rubbing against hard surfaces in bits and shreds, as the animal gets some sort of itch to get rid of the same. Plate-I-A depicts this entire sequence in all the stages. After the rutting season is over, some of the cement holding the base of the antlers to the pedicels gets weakened. This causes the antlers to finally break off due to impact against any hard surface. The close linkage of the growth of antlers with the rutting season is thus a clear pointer to these being some sort of a secondary sexual character.

The fast growth of antlers is almost akin to the growth of sarcoma or cancerous bodies. Their quick re-growth also parallels that of a malignant neoplasm.

According to another theory, the antlers serve to act as a cooling device during the summer season particularly as the velvet covering these radiates body heat due to its considerable surface containing peripheral blood vessels and sweat glands.

BIOCHEMISTRY OF ANTLERS

Testosterone, which is a male sex hormone, is produced by Leydig's cells existing in the tissues of the testicles. These have a significant role in the formation of antlers as castrating the males soon after their birth results in affecting the shapes and sizes of antlers. Similarly when the testicles are removed after the shedding of velvet, the antlers drop and their re-growth is in the shape of small permanent antlers. Growth can also be prevented in a male with female sex injection. Again, antlers may also grow on the heads of females due to hormonal disorders. In addition to testosterone, the thyroid gland and the anterior lobe of the pituitary gland also have an effect on the growth of antlers. Thus the gradual calcification of cartilage is due to the stimulus to the testosterone by the pituitary gland, especially in the early stages. Their rate of growth is controlled by the thyroid gland. All these factors lead one to the conclusion that the antlers are primarily secondary sexual characters of the deer family.

MEDICINAL USE OF ANTLERS

According to researches by some scientists from Russia, extracts of antlers are of use in curing wounds and also act as aphrodisiac in old age. Dried velvet, after being boiled in water, is reported to have similar properties. In the Indian indigenous system of medicine, antler pastes are used for curing pneumonia and allied cold conditions particularly in children.

ANTIQUITY OF ANTLERS

A study of fossils suggests that the evolution of deer began in Asia sometime by the middle of Tertiary, although the first antlered Cervid, perhaps *Dicrocerus*, was an Ungulate of early Miocene and had very short antlers in the form of spikes. The growth of antlers as we know these today might have started sometime by the Late Pliocene. It is believed that all the present deer forms have evolved from a common ancestor known as *Cervius tarakalensis* from that period. This may be about twenty five million years back in time. The deer population started expanding and radiating in Pleistocene when these expanded to adjoining temperate regions. It was however from Europe that optimum sized antlers have been reported. Thus the Irish giant deer *Megaloceros giganteus* of the early Ice Age had antlers spanning over 3.5 meters, or nearly fourteen feet, which weighed over 75.00 kilograms. A pictorial representation is given in Plate IIB.

It is also rather curious that the African Continent that was perhaps the evolutionary nursery of so many mammals including the human beings, is singularly deficient in deer fossils of any kind, and even today, there are no indigenous deer in that region.

HORNS

Horns are headpieces of Bovidae, such as cattle, sheep and goats, and their wild relatives.

The structure of horns is radically different from those of the antlers. These consist mainly of keratin, the protein that is the main constituent of nails, hooves, hairs, scales, feathers, claws and other hard material that had formed from the hollow tubular filaments from the inner epidermal layers of skin known as *stratum germinatum*. Like overgrown nails there is no circulation of blood through the same, and there are no nerves continuing to more filaments, and attain their final size and shape by expansion from their origin in an epidermal layer within the skull. Thus, in essence, these are composed of bony material covered with horned sheath. This bony structure develops in the mesoderm, or the lower layer of the skin of the forehead. Subsequently these get fused with their frontal bone of the skull. The outer skin, or the ectoderm develops into a hollow conical shape covering the bony structure. (Plate I).

With the exception of the four horned antelope, or the chausingha, these exist in symmetrical pairs in a variety of forms: twisted, curved spiralled, coiled, helical or zigzag. These all, however end in a single strong spear that in most cases are capable of tossing or impaling their enemies or conspecifics. It is also important to note that these occur in both males as also in females, although these may be somewhat smaller in females. As opposed to Cervidae, these are neither sex related nor are deciduous at any point of time. Although these are seldom known to have been used against predators in defending themselves, it is possible that the predators purposely avoid attacking bovid from the front due to the horns, and usually attack from the flank, or use necks as their target. However, fighting members of their own species for amassing 'harems', or for the sake of territory, quite often use these for tossing their opponents for showing supremacy. Most of the horns are hollow and are mounted like a shoe directly on a spike like *os cornu* (os: bone, cornu: horn) which projects from the frontal bone of the skull. Part of frontal sinus can often be found in the centre of *os cornu*. *Stratum germinatum* lines the developing horn and produces its slow growth by continuing to secrete filaments. Horns can not re-grow as any operation to dehorn an animal destroys the filament secreting epidermal tissues.

ANTIQUITY OF HORNS

Horns are believed to have evolved during the last one million years. Dinosaurs like the Triceratops that had developed during the Cretaceous period had horns (Plate II-A). The present day rhinoceros

like creatures started developing horns some million years back.

Although the Bovidae and the Cervidae are so similarly in form, and probably had a common ancestor at some point of time, the difference in the structures of antlers and horns indicates that from that time onwards, these developed through separate evolutionary lines.

Plates III to VI depict antlers and horns of Indian Ungulata. It may however be borne in mind that quite often there are variations in these forms due to different ecological, hereditary, or individual characters. Also, some times there are different shapes of horns in the males and females of the same species.

RECORD SIZES OF ANTLERS AND HORNS

In the hey days of shooting and 'shikar' the records pertaining to the measurements of horns and antlers were treated to be of prime importance by the elites as these used to be compared amongst themselves for showing their supremacy. In fact, it is said that some old time princely classes used to get special measuring tapes made that read eleven inches as one foot! This was just for exaggerating their actual measurements. But with the gradual depletion of forest cover, and consequently of the wildlife therein, along with a blanket ban on shooting within forest areas, these have lost their importance of by-gone days.

Now in view of the different claims and counter claims made by wild life enthusiasts and naturalists in their articles and letters to various wild life or forestry journals, magazines and books, there is a considerable difficulty in obtaining factual and final figures indicating the maximum sizes obtained by the various parameters pertaining to antlers and horns of Indian Ungulata. This is because the mention of record sizes by several authors, past and present, like Blanford, Forsyth, Sterndale, Lydekker, Rowland Ward, Burke and others in back issues of 'The Field'. The Journal of Bombay Natural History Society', 'The Indian Forester' etc. have quite often given different figures in respect of these parameters that are based upon the measurements made by different persons in different periods during the last one hundred and fifty years or so. As such, an effort has been made in this article to give the maximum sizes achieved and reported in respect of these as collected from all the available sources. The main parameters are the maximum lengths of these head pieces along the outer curve, basal circumference, and distance from tip to tip. Wherever available, the total numbers of points have also been given. It may however be understood that these measurements of all the individual species, as given in the adjoining table may not be from the same individual. Today, these give us some idea of the maximum sizes attained in each case. The attached table attempt to give an integrated picture of the Indian species. Also, since most of the older books and journals are not available, these could not be consulted, and to that extent, this data can not be deemed to be final.

Today, with an expanding population all over the country, making inroads over the former vast tracts of forests, due to so many socio-political pressures, these areas are getting decimated quite fast. As a result, the wild life population inhabiting these has gone down to an alarming level, both qualitatively as also quantitatively. The big herds observed before have vanished to the point of extinction in the case of several species mentioned in this article, or have reached a critical stage. It will therefore be naturally a big surprise to find any individual of any species mentioned here to have antlers and horns having measurements exceeding those figures. As such, these records are today solely of an academic interest, and just indicate what we and our succeeding generations have lost within so short a period within our country.

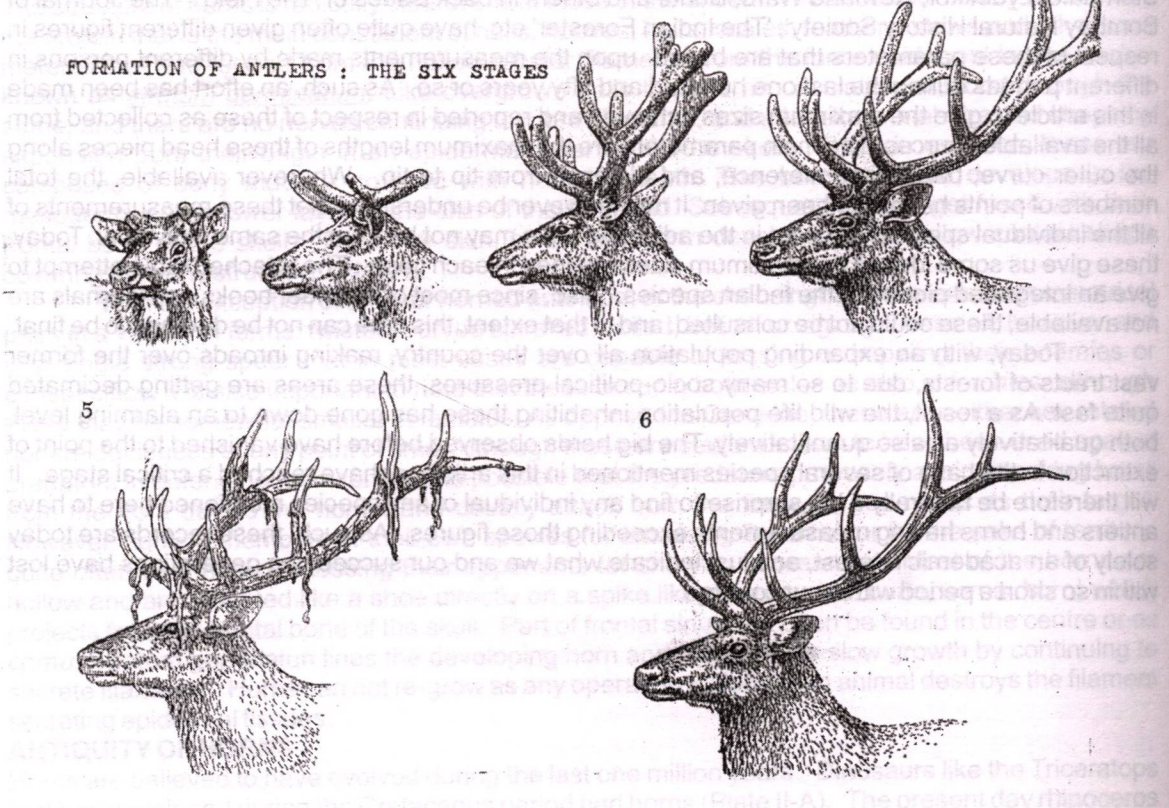
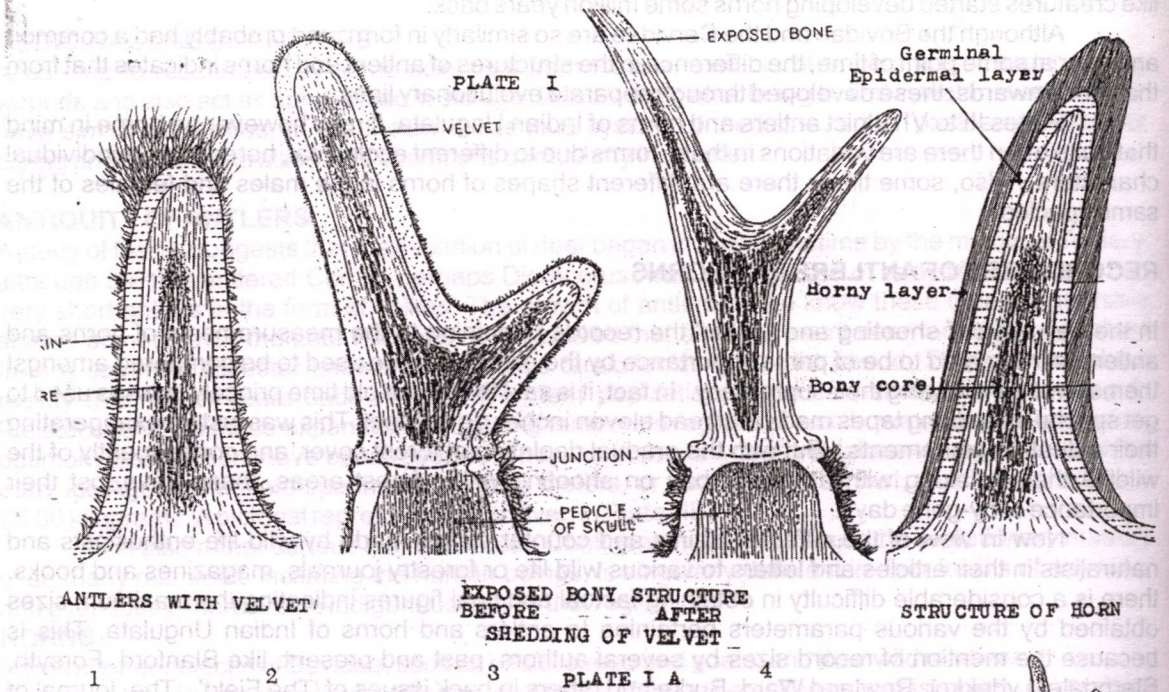
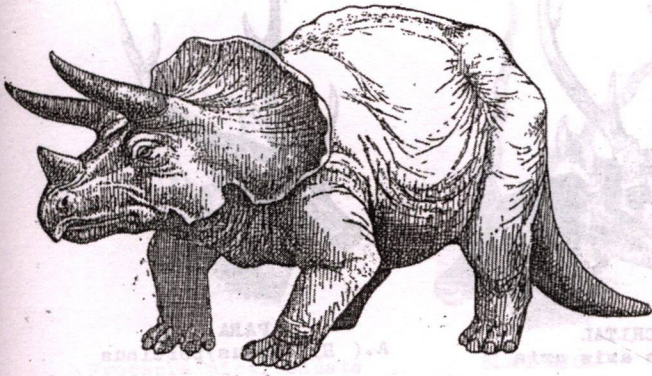


PLATE II A



TRICERATOPS (CERATOPSIAN)
Late Cretaceous

PLATE II B



GIANT IRISH ELK
MEGALOCERUS GIGANTEOUS
(Early Ice Age)

PLATE III



KAKAR
Muntiacus muntjak



CHITAL
Axis axis axis



PARA
A. (Hyelaphus) porcinus



SAMBHAR
C. (Rusa) unicolor



BARASINGHA, GOND
Rucervus duvaucelli



THAMIN
Rucervus eldi thamin



HANGUL
Cervus elaphus affinis

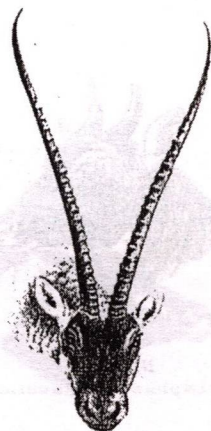
PLATE IV



GOA
Procapra picticaudata



BLACKBUCK
Antilope cervicapra



CHIRU
Pantholops hodgsoni



GHURAL
Naemorhaedus goral



SEROW
Capricornis sumatransis



THAKIN
Budrocas taxicolor



MARKHOR
Capra falconeri

PLATE V



NILGAI
Boselaphus tragocamelus



CHAUSINGHA
Tetracerus quadricornis



ARNA, JANGALI BHAINSA
Bubalus arnee



GAUR
Bos gaurus



GAYAL
Bos (Bibos) gaurus frontalis



YAK
Bos mutus grunniens



CHINKARA
Gazella bennetti

PLATE VI



ASIATIC IBEX
Capra ibex siberica



TAHR
Hemitragus jemlahicus



NILGIRI TAHR
Hemitragus hylocrius



BHARAL, BLUE SHEEP
Pseudois nayaur



NYANG
Ovis ammon hodgsoni



URIAL
Ovis ammon cycloceros



GREAT PAMIR SHEEP
Ovis ammon polii

RECORDS OF ANTLERS AND HORNS OF INDIAN UNGULATA

Sl. No.	Local name	Zoological name	Length along outer curve		Circumference		Tip to tip (Straight line or sweep)		Points
			Inches	Cms	Inches	Cms	Inches	Cms	
1.	Kakar	Muntiacus muntjak	11.00	27.94	5.00	12.50	6.00	15.24	-
2.	Para	A.(Hyelaphus)porcinus	26.00	66.00	7.12	18.08	22.50	57.15	-
3.	Chital	Axis axis	40.00	101.60	6.00	15.24	34.00	86.36	5+5
4.	Sambhar	C.(Rusa) unicolor	50.87	129.21	11.75 (Mid beam)	29.84	44.72	113.59	8+6
5.	North Indian Barasingha, Gond	Rucervus duvaucelli	41.00	104.14	9.00	22.86	47.00	119.38	28
6.	Thamin	Rucervus eldi thamin	42.00	106.68	8.25	20.96	35.50	90.17	3+3
7.	Hangul	Cervus elephus affinis	55.75	141.60	8.00	20.32	50.25	137.68	8+8
8.	Nilgai	Boselaphus tragocamelus	11.75	29.84	9.75	24.76	8.25	20.95	-
9.	Chausingha	Tetracerus quadricornis	7.25 3.00	18.41 7.62	2.62 2.62	6.65 6.65	3.00 2.88	7.62 7.31	-
10.	Arna (Sweep)	Bubalus arnee	78.50 14 feet	199.39 426.72	23.00	58.42	172.00	436.88	-
11.	Gaur	Bibos gaurus	48.00	121.92	22.50	57.15	56.00	142.24	87" round sweep
12.	Gayal	Bos (Bibos) gaurus frontalis	22.75	57.78	20.25	51.43	42.00	106.68	-
13.	Yak	Bos mutus grunniens	40.00	46.35	19.00	48.26	41.00	104.14	-
14.	Chinkara	Gazella bennettii	27.75	70.48	6.12	13.00	8.75	22.22	-
15.	Goa	Procapra picticaudata	15.75	40.00	4.00	10.16	6.25	15.87	-
16.	Blackbuck	Antelope cervicapra	30.75	78.10	6.25	15.87	28.75	73.02	-
17.	Chiru	Pantholops hodgsoni	30.00	76.20	6.50	16.51	19.25	48.89	-
18.	Ghural	Naemorhaedus goral	10.85	27.56	4.75	11.25	5.12	13.00	-
19.	Serow	Capricornis sumatrensis	13.50	34.29	6.50	16.51	6.00	15.24	-
20.	Thakin	Budrocas taxicolor	25.00	63.50	13.00	33.02	14.75	37.46	-
21.	Markhor	Capra falconeri	65.00	165.10	14.75	37.46	52.00	132.08	-
22.	Asiatic-ibex	Capra ibex siberica	59.50	151.13	13.50	34.24	52.00	132.08	-
23.	Tahr	Hemitragus jemlahicus	16.50	41.91	11.50	29.21	9.00	22.56	-
24.	Nilgiri Tahr	Hemitragus hylocrius	17.50	44.45	9.88	25.09	7.88	20.01	-
25.	Bharal	Pseudois nayaur nayaur	33.25	84.45	13.50	34.29	34.00	86.36	-
26.	Nyang	Ovis ammon hodgsoni	57.00	144.78	25.00	63.50	31.00	78.74	-
27.	Great Pamir sheep	Ovis ammon polii	75.00	190.50	18.75	47.62	54.50	138.43	-
28.	Urial	Ovis ammon cycloceros	41.50	105.41	12.25	31.11	19.00	48.26	-

Urban birds of Udaipur city (Rajasthan) and their conservation problems

Vijay Kumar Koli¹, Chhaya Bhatnagar² and Mohm. Yasheen

Abstract

A study was conducted in Udaipur city to estimate bird diversity and their conservation problems, from 2007 to 2009. During the study period 46 species of terrestrial and 41 species of aquatic birds were identified which belonged to 24 and 13 families. In terrestrial birds 44 species were residential and 2 species were winter migratory and according to IUCN 2009 categorization 45 species were least concern and only 1 species (Egyptian vulture) was found in endangered category. In aquatic birds 16 species were winter migratory and 25 species were resident and according to IUCN, 3 species (Painted stork, Black-headed ibis and Black-tailed godwit) were near threatened category and 38 species were least concern category. The study showed that number of bird species was little from their surrounding areas and faced many conservation problems.

Key words: Udaipur city, terrestrial, aquatic, residential, winter migratory, endangered, near threatened, IUCN

Introduction

The primary impacts of urban development on biodiversity are loss and fragmentation of habitat, and changes in the structure, composition and function of remnant native ecosystems (Forman 1995, Marzluff and Ewing 2001, Faulkner 2004). Birds are often used as indicators of the health of ecosystems (i.e. bio-indicators). Since an appropriately diverse ecology is needed to support a healthy number and range of species, a lower than expected number or range of species in an environment indicates poorer ecological health. Given the decline in biodiversity worldwide, it is important that wildlife, particularly rare and threatened species are able to persist in fragmented urban landscapes. This is influenced by species' life history traits such as diet, nesting requirements, and degree of arboreality (Laurance 1990).

Thus Udaipur city is surrounded by lush green and natural habitat which support high number of bird species (Sharma 1998). Udaipur has eight important bird areas (IBA) sites (Islam and Rahmani 2004) within the limits of Udaipur Wildlife Division and there are four Wildlife Sanctuaries (Phulwari Wildlife Sanctuary, Kumbhalgarh Wildlife Sanctuary, Jaisamand Wildlife Sanctuary, Sajjangan Wildlife Sanctuary) and one Nature park (Baghdarrah Nature Park). But the environment of Udaipur city is quite different when compared to surrounding areas. It is highly developed with increasing high population. Number of bird species lives in their surrounding natural areas but all bird species can't tolerate this urbanization pressure to survive. Mostly research has traditionally focused on pristine, undisturbed habitats (McDonnell 1997), but fundamental ecological processes in urbanized environments and affect on birds remain poorly understood (Rutz 2008). So, study was conducted to estimate bird diversity, conservation problem and their management implications in Udaipur City.

Study area

Udaipur is situated in Southern part of Rajasthan state and located between 24°35' N and 24°58' N Latitudes and 73°41' E and 73°68' E Longitudes. It is about 598m above mean sea level. The district has a total area of about 64.1 Sq.km. River Ahar flows diagonally from north – west to south west of the city. The city is encircled by Aravallis ranges of height ranging from 558 m to 767 m above M.S.L. from North to south. It has undulating and rocky terrain. The temperature varies between a maximum of 42.3°C and a minimum of 28.8°C during summers. Winter is generally from November to February. Winters are colder with the maximum temperature rising to 28.8°C and the minimum dipping to

¹Aquatic Toxicology and Wildlife Research Laboratory

Department of Zoology, Mohanlal Sukhadia University, Udaipur, Rajasthan (India)

²Email- ¹vijaykoli87@yahoo.in ²bhatnagarchhaya@yahoo.co.in

2.5°C. Two major lakes situated within city area, are Fateh sager Lake and Pichola Lake.

As per 2001 Census, the population of Udaipur city was 3.89 lac, with an average density of 35 persons per acre. The administrative boundary of Udaipur municipal area spreads over 64.1 sq km. According to 1991 census, 50 % of the city's population resides in the walled city which is 515 acres (8% of the total area). There was sudden rise in population during 1970 - 80 as there was a lot of industrial development in the city (Saha 2009). Sudden rise in the developmental activities in the city has given rise to so many problems like lack of good infrastructural facilities, rise in migration, growth of slums, all of this leading to the deterioration of the city ecosystem.

Material and methods

The bird survey in the Udaipur city premises was done for two years from 2007 to 2009. The survey techniques used included visual encounter surveys, line transects, and spot counts within the study site. The survey was done during various time periods of the day using binoculars, monocular telescopes and direct observations. In order to consider both diurnal and nocturnal species, the survey was conducted in three sessions: 0600-1200 hr, 1600-1900 hr and 2100-2300 hr. The identification of birds according to their status and altitude range was based on Ali and Ripley (2007) and Grimmett *et al.* (1999). During the bird surveys, human activities that potentially pose threats to the bird populations were also noted.

Result and discussion

During the study period 46 species of terrestrial (Table 1) and 42 species of aquatic birds (Table 2) were identified which belonged to 24 and 14 families. In terrestrial birds 44 species were residential (R) and 2 species were winter migratory (WM) and according to IUCN 2010 categorization 45 species were least concern (LC) and only 1 species (Egyptian vulture) was found in endangered (EN) category. Egyptian vultures were observed many times over the Udaipur city during their showering activity and searching for food. In aquatic birds 17 species were winter migratory (WM) and 25 species were resident (R) and according to IUCN 2009, 3 species (Painted stork, Black-headed ibis and Black-tailed godwit) were near threatened (NT) category and 39 species were least concern (LC) category.

Study showed that urban area of Udaipur city harbor 95.65% (44 species) terrestrial birds were residential and found in good number; indicate that which birds tolerate human being settlements can easily thrive but the number of bird species was low from their surrounding areas. Sharma (1998) reported 114 terrestrial bird species in Sajjanganrh Wildlife Sanctuary, which is located on the outskirts of Udaipur city. Number was very high from present study in urban area of Udaipur city. Urban environments typically homogenize animal communities, and this results, for example, in the same few bird species being found everywhere (McKinney 2009). Certain birds are found in and around the sanctuary area and also they have been seen in the city area. The possible explanation is that these birds have differentiated between their roosting and feeding areas.

Many areas of the city provide a suitable habitat for urban birds like urban domestic gardens, historical garden (Gulab bagh and Sahelio ki Bari), urban forest, road side trees, and colleges and university campus. Trees in urban systems provide a variety of ecosystems services including biodiversity conservation, removal of atmospheric pollutants, oxygen generation, noise reduction, mitigation of urban heat island effects, microclimate regulation, stabilization of soil, ground water recharge, prevention of soil erosion, and carbon sequestration (Bolund and Hunhammar 1999).

Major problems

The process of urbanization removes fragments and isolates natural vegetation, replacing it with roads and buildings and it introduces exotic plants, predators and competitors to the native wildlife. The result is typically a landscape vastly different from the original, with the original vegetation often surviving only in small pockets scattered throughout the city. Besides urbanization, birds of Udaipur city are facing many problems for survival. These are:

- Changed vegetation structure
- Changed vegetation composition
- Distance from natural vegetation

- Interactions with other birds
- Non-native Predators (e.g., cats, stray dogs)
- Lack of nesting sites
- Destruction of ecosystem process
- Noise
- Habitat alteration
- Food Supply Changes
- Pollution
- Increasing human population

Recommendations

While we cannot replicate a large, continuous, nature area of vegetation, and therefore cannot encourage all birds into urban habitats, we can create habitats that can be used by a wide variety of native birds. While preserving and enhancing the remaining natural vegetation and riparian habitats in urban areas of Udaipur is paramount, they should be coupled with the development of a series of corridors connecting these patches throughout the urban matrix. Remediation efforts should be done slowly, and completed over a long time period in order to minimize disturbances to the birds already present and provide them with ongoing habitat. The value of exotic vegetation, including weed species, for birds should be recognized and removal should only be conducted after new plantings become established.

The value of suburban parks, streetscapes and gardens for providing bird habitat must also not be underestimated. However, the development of suitable habitat that provides a diverse range of structures and different species needs to occur at the landscape scale rather than the individual garden scale. Thus, regulatory framework of public policy for future urbanization of Udaipur should build strong incentives to encourage development of private domestic gardens with a preponderance of local tree species.

However, it is recognized that for many people, feeding birds is the only contact they have with wildlife and it can therefore be an important part of their wellbeing. In this case, feeding areas must be kept clean and only good quality seed or nectar mix should be provided. There is evidence that some artificial foods can spread disease and are nutritionally poor. The provision of bird baths and nest boxes in a garden can prove not only valuable for the birds, but a great way to educate homeowners, as long as usage by introduced species is monitored, and hygienic practices are followed.

Number of birds species often increase with increasing size of urban green spaces. Thus, maintaining larger green spaces with high structural diversity may be effective in maintaining bird diversity in urban systems (Khera *et al.* 2009). In the face of rapid urbanization of Udaipur city, developing forest lands as urban green spaces and botanical gardens would be a prudent conservation strategy. Biodiversity in urban green spaces can be large. If decline in some species are to be arrested or reversed, conservation effort will need to focus much more strongly on understanding and managing urban populations, because these might buffer some species against regional population depletion.

The protection of remaining natural areas should always be the number one priority for providing bird habitat. Urban habitats have the capacity to support a range of bird species and become important components of the conservation network. Search for food is not a problem in the city, due to human influence, but there will be fight for the best nesting places. So we have to provide nesting places for birds in Udaipur city.

Reference

Ali, S. and Ripley, S. D. 2007. *Handbook of the birds of India and Pakistan. Second impression.* Oxford University press.

Bolund, P. and Hunhammar, S. 1999. Ecosystem services in urban areas. *Ecological Economics* 29:

- Faulkner, S. 2004. Urbanization impacts on the structure and function of forested wetlands. *Urban Ecosystem* 7: 89–106.
- Forman, R.T.T. 1995. *Land Mosaics. The Ecology of Landscapes and Regions*. Cambridge Press, Cambridge.
- Grimmett, R., Inskipp, C. and Inskipp, T. 1999. *Birds of the Indian Subcontinent*. Oxford University Press.
- Islam, Z. A. and Rahmani, A. R. (2004). Important Bird Areas in India. Priority sites for conservation. Indian Bird Conservation Network: J. Bombay Nat. Hist. Soc. and Birdlife International (U. K.) pp.XVIII + 1133.
- Khera, N., Mehta, V. and Sabata. B. C. 2009. Interrelationship of birds and habitat features in urban greenspaces in Delhi, India. *Urban Forestry & Urban Greening* 8(3): 187-196.
- Laurance, W.F. 1990. Comparative responses of five arboreal marsupials to tropical forest fragmentation. *Journal of Mammalogy*, 71.
- Marzluff, J.M. and Ewing, K. 2001. Restoration of fragmented landscapes for the conservation of birds: a general framework and specific recommendations for urbanizing landscapes. *Restoration Ecology* 9: 280–292.
- McDonnell, M. J. 1997. A paradigm shift. *Urban Ecosystems*, 1: 85–86.
- McKinney, M. L. 2009. Urbanization as a major cause of biotic homogenization. *Biol. Cons.* 127: 247–260.
- Rutz, C. 2008. The establishment of an urban bird population. *Journal of Animal Ecology*. 1-12. (doi: 10.1111/j.1365-2656.2008.01420.x)
- Saha, S. K. 2009. Human settlements. *ENVIS Newsletter*, vol. 1: 1-8.
- Sharma S. K. 1998. Avian fauna of Sajjanganrh Wildlife Sanctuary. *Newsletter for bird Watchers*, 38 (2): 25-27.
- Bound, P. and Hurtt, M. 1999. Ecosystem services in urban areas. *Ecological Economics* 29

Table 1: Checklist of terrestrial birds in Udaipur city, observed during 2007-2009.

S.NO.	Family	Scientific Name	Common Name	Local status	IUCN 2009
1.	Accipitridae	<i>Elanus caeruleus</i>	BLACK-WINGED KITE	R	LC
		<i>Milvus migrans</i>	BLACK KITE	R	LC
		<i>Accipiter badius</i>	SHIKRA	R	LC
		<i>Neophron percnopterus</i>	EGYPTIAN VULTURE	R	EN
2	Phasianidae	<i>Pavo cristatus</i>	INDIAN PEAFOWL	R	LC
		<i>Perdica asiatica</i>	JUNGLE BUSH QUAIL	R	LC
3	Charadriidae	<i>Vanellus indicus</i>	RED-WATTLED LAPWING	R	LC
4	Columbidae	<i>Columba livia</i>	ROCK PIGEON	R	LC
		<i>Streptopelia decaocto</i>	EURASIAN COLLARED DOVE	R	LC
		<i>Streptopelia tranquebarica</i>	RED COLLARED DOVE	R	LC
5	Psittacidae	<i>Psittacula krameri</i>	ROSE-RINGED PARAKEET	R	LC
6	Cuculidae	<i>Eudynamis scolopacea</i>	ASIAN KOEL	R	LC
		<i>Centropus sinensis</i>	GREATER COUCAL	R	LC
7	Strigidae	<i>Athene brama</i>	SPOTTED OWLET	R	LC
8	Caprimulgidae	<i>Caprimulgus asiaticus</i>	INDIAN NIGHTJAR	R	LC
9	Apodidae	<i>Apus affinis</i>	HOUSE SWIFT	R	LC
10	Alcedinidae	<i>Halcyon smymensis</i>	WHITE-THROATED KING FISHER	R	LC
		<i>Ceryle rudis</i>	PIED KINGFISHER	R	LC
11	Meropidae	<i>Merops orientalis</i>	GREEN BEE-EATER	R	LC
12	Coraciidae	<i>Coracias benghalensis</i>	INDIAN ROLLER	R	LC
13	Upupidae	<i>Upupa epops</i>	COMMON HOOPOE	R	LC
14	Bucerotidae	<i>Ocyrceros birostris</i>	INDIAN GREY HORNBILL	R	LC
15	Megalaimidae	<i>Megalaima haemacephala</i>	COPPERSMITH BARBET	R	LC
16	Hirudinidae	<i>Hirundo concolor</i>	DUSKY CRAG MARTIN	R	LC
		<i>Hirundo smithii</i>	WIRE-TAILED SWALLOW	R	LC
17	Sturnidae	<i>Sturnus pagodarum</i>	BRAHMINY STARLING	R	LC
		<i>Acridotheres tristis</i>	COMMON MYNA	R	LC
		<i>Acridotheres ginginianus</i>	BANK MYNA	R	LC
18	Dicruridae	<i>Dicrurus adsimilis</i>	BLACK DRONGO	R	LC
19	Corvidae	<i>Dendrocitta vagabunda</i>	RUFIOUS TREEPIE	R	LC
		<i>Corvus splendens</i>	HOUSE CROW	R	LC
		<i>Corvus macrorhynchos</i>	LARGE-BILLED CROW	R	LC
20	Pycnotidae	<i>Pycnonotus cafer</i>	RED-VENTED BULBUL	R	LC
21	Muscicapidae	<i>Turdoides caudatus</i>	COMMON BABBLER	R	LC
		<i>Turdoides malcolmi</i>	LARGE GREY BABBLER	R	LC
		<i>Prinia socialis</i>	ASHY PRINIA	R	LC
		<i>Orthotomus sutorius</i>	COMMON TAILORBIRD	R	LC
		<i>Copsychus saularis</i>	ORIENTAL MAGPIE ROBIN	R	LC
		<i>Saxicoloides fulicata</i>	INDIAN ROBIN	R	LC
		<i>Cercomela fusca</i>	BROWN ROCK – CHAT	R	LC
22	Motacillidae	<i>Anthus novaeseelandiae</i>	PADDYFIELD PIPIT	R	LC
		<i>Motacilla alba</i>	WHITE WAGTAIL	WM	LC
		<i>Motacilla madaraspatensis</i>	WHITE-BROWED WAGTAIL	R	LC
		<i>Motacilla flava</i>	YELLOW WAGTAIL	WM	LC
23	Nectarinidae	<i>Nectarinia asiatica</i>	PURPLE SUNBIRD	R	LC
24	Ploceidae	<i>Passer domesticus</i>	HOUSE SPARROW	R	LC

Table 2: Checklist of aquatic birds in Udaipur city (Fateh Sagar Lake and Pichola Lake), observed during 2007-2009.

S.No.	Family	Scientific Name	Common Name	Local Status	IUCN 2009
1	Pelecanidae	<i>Pelecanus onocrotalus</i>	GREAT WHITE PELICAN	WM	LC
2	Podicipedidae	<i>Tachybaptus ruficollis</i>	LITTLE GREBE	R	LC
3	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	GREAT CORMORANT	R	LC
		<i>Phalacrocorax niger</i>	LITTLE CORMORANT	R	LC
5	Ardiidae	<i>Ardea cinerea</i>	GREY HERON	WM	LC
		<i>Ardeola grayii</i>	INDIAN POND HERON	R	LC
		<i>Bubulcus ibis</i>	CATTLE EGRET	R	LC
		<i>Mesophoyx intermedia</i>	INTERMEDIATE EGRET	R	LC
		<i>Egretta garzetta</i>	LITTLE EGRET	R	LC
		<i>Ardea purpurea</i>	PURPLE HERON	R	LC
6	Ciconiidae	<i>Mycteria leucocephala</i>	PAINTED STORK	R	NT
		<i>Anastomus oscitans</i>	ASIAN OPENBILL STORK	R	LC
		<i>Ciconia episcopus</i>	WOOLY-NECKED STORK	R	LC
7	Threskiornithidae	<i>Threskiornis melanocephalus</i>	BLACK-HEADED IBIS	R	NT
		<i>Pseudibis papillosa</i>	BLACK IBIS	R	LC
		<i>Platalea leucorodia</i>	EURASIAN SPOONBILL	R	LC
8	Phoenicopteridae	<i>Phoenicopiterus ruber</i>	GREATER FLAMINGO	WM	LC
9	Anatidae	<i>Anas clypeata</i>	NORTHERN SHOVELER	WM	LC
		<i>Tadorna ferruginea</i>	RUDDY SHELDUCK	WM	LC
		<i>Anas platyrhynchos</i>	MALLARD	WM	LC
		<i>Aythya ferina</i>	COMMON POCHARD	WM	LC
		<i>Anas crecca</i>	COMMON TEAL	WM	LC
10	Rallidae	<i>Porphyrio porphyrio</i>	PURPLE MOORHEN	R	LC
		<i>Fulica atra</i>	COMMON COOT	R	LC
		<i>Gallinula chloropus</i>	COMMON MOORHEN	R	LC
		<i>Amauornis phoenicurus</i>	WHITE-BREASTED WATERHEN	R	LC
11	Jacaniidae	<i>Hydrophasianus chirurgus</i>	PHEASANT-TAILED JACANA	R	LC
		<i>Metopidius indicus</i>	BRONZE-WINGED JACANA	R	LC
12	Recurvirostridae	<i>Himantopus himantopus</i>	BLACK-WINGED STILT	R	LC
13	Rostratulidae	<i>Gallinago gallinago</i>	COMMON SNIPE	WM	LC
		<i>Charadrius dubius</i>	LITTLE RINGED PLOVER	R	LC
		<i>Charadrius alexandrinus</i>	KENTISH PLOVER	WM	LC
		<i>Actitis hypoleucos</i>	COMMON SANDPIPER	WM	LC
14	Laridae	<i>Sterna aurantia</i>	RIVER TERN	R	LC
		<i>Anas poecilorhyncha</i>	SPOT BILLED DUCK	R	LC
		<i>Anas acuta</i>	NORTHERN PINTAIL	WM	LC
		<i>Aythya fuligula</i>	TUFTED DUCK	WM	LC
		<i>Limosa limosa</i>	BLACK-TAILED GODWIT	WM	NT
		<i>Tringa totanus</i>	COMMON REDSHANK	WM	LC
		<i>Tringa glareola</i>	WOOD SANDPIPER	WM	LC
		<i>Vanellus indicus</i>	RED-WATTLED LAPWING	R	LC
		<i>Larus ichthyaetus</i>	PALLAS'S GULL	WM	LC

Acronyms: R = resident, WM = winter migratory, LC =least concern, NT = near threatened

कृषि विकास और वन्य प्राणि

डा० एस०पी० सिंह एवम् डा० विजय लक्ष्मी सिंह

प्राकृतिक संसाधनों में पृथ्वी का चौथाई भाग भूमि है। भूमि अपने आप में एक अति महत्वपूर्ण संसाधन है। इसी के दो महत्वपूर्ण घटक कृषि-भूमि और वन एवं वन्य प्राणि हैं। प्राचीन काल से ही मनुष्य इन संसाधनों का भरपूर उपयोग करता रहा है। बीसवीं सदी में इन संसाधनों पर विकास का व्यापक प्रभाव पड़ा है।

जनसंख्या विस्फोट -

बीसवीं सदी की सबसे जटिल समस्या मानव जनसंख्या विस्फोट है। इस बृहद मानव समुदाय को रोटी, कपड़ा और मकान चाहिए। इन तीनों आवश्यकताओं की पूर्ति हेतु मानव भूमि पर निर्भर है। कृषि भूमि विकास मानव के लिए हमेशा चिन्ता का विषय रहा है। माल्थस के अनुसार जनसंख्या विस्तार ज्यामितीय अनुपात में होता है। मगर कृषि उत्पादन (खाद्यान्न) गणितीय अनुपात में होता है। अतः प्रत्येक मनुष्य को भरपूर भोजन मिल पाना संभव नहीं है क्योंकि पृथ्वी का क्षेत्रफल तो सीमित है। मानव जनसंख्या को सीमित रखना अति आशयक है।

कृषि भूमि विस्तार -

अधिक से अधिक अन्न (खाद्यान्न) उपजाने के लिए कृषि योग्य भूमि का विस्तार किया गया। इसके लिये हरे भरे जंगल काटे गये तथा घास के मैदान जोत डाले गये, जिनमें वन्य प्राणि निवास करते थे। उत्तरांचल राज्य में आज जहाँ पर जी०बी० पन्त कृषि विश्वविद्यालय स्थित है वहाँ पर कभी शेर-चीते और हिरन वगैरह का आवास हुआ करता था। इस तराई क्षेत्र में अब कृषि कार्य हो रहा है और वन्य प्राणी सिर्फ कार्बेट राष्ट्रीय उद्यान में ही सिमट कर रह गये हैं। इन प्राणियों पर कृषि जनित घातक प्रभाव पड़ रहे हैं।

कृत्रिम रसायनों का प्रयोग:-

खाद्यान्न उत्पादन बढ़ाने के लिए कृत्रिम रसायनों का प्रयोग बढ़ा है। खादों के अलावा कीटनाशक, खरपतवार नाशक और फफूंद नाशक रसायनों का प्रयोग प्रचुर मात्रा में हो रहा है। ये रसायन खेतों से वन्य प्राणियों के क्षेत्र में बहने वाले नदी, नालों, तालाबों, झीलों, पोखरों आदि में मिल जाते हैं। ये रसायन खाद्य श्रृंखला के माध्यम से अपने से बड़े और सभी प्रकार के वन्य प्राणियों के शरीर में पहुँच जाते हैं। डी०डी०टी०, हेप्टाक्लोर व मिथाइल व मरकरी कुछ ऐसे ही रसायन हैं जिनका प्रभाव बहुत ही घातक होता है।

आवास विनाश:-

कृषि भूमि विस्तार होने से वन्य प्राणियों का आवास सिकुड़ता जा रहा है। खेतों की मेड़ों को लगभग समाप्त ही कर दिया गया है। पहले खेतों के बीच चौड़ी मेंड हुआ करती थी। उनके बीच कुछ झाड़ियाँ भी उगा करती थी जिनमें छोटे वन्य प्राणि छुपे रहते थे। खेतों के आसपास जलाशय, तालाब एवम पोखर आदि हुआ करते थे, जिनमें वन्य प्राणी पानी पीते थे तथा दूसरे जल जीव निवास करते थे। अब तालाब खत्म होते जा रहे हैं उनकी जगह पर कृषि कार्य हो रहा है जिससे वन्य प्राणियों पर व्यापक प्रभाव पड़ा है।

वन्य प्राणि क्षेत्र से सटे हुए खेतों में बिजली के तार की बाड़ उनके लिए प्राणघातक सिद्ध हो रही है।

कृषि कार्य हेतु पालतू पशुओं का वन्य प्राणि क्षेत्रों में प्रवेश उनके लिए हानिकारक है। ये पालतू पशु वन्य प्राणियों का भोजन चट कर जाते हैं और उनमें कुछ बीमारियाँ भी फैलाते हैं। पालतू पशुओं की संख्या में भी बढ़ोत्तरी हो रही है। इस प्रकार पालतू पशुओं की दखलंदाजी वन्य प्राणियों के आवास पर हमला जैसा ही है।

प्रजनन अक्षमता

समुचित आवास (Habitat), आवरण (Cover) न मिल पाने के कारण वन्य प्राणि स्वच्छन्द सहवास नहीं कर पा रहे हैं जिससे उनमें जनन अक्षमता बढ़ रही है। भोजन और पानी में मिले कृषि रसायन धीमे जहर का कार्य कर रहे हैं। इनका प्रभाव सीधे तौर पर प्रजनन प्रजातियों के अण्ड कवचन कमजोर हो रहे हैं। ऐसे अण्डे भ्रूण बनने से पहले ही नष्ट हो जाते हैं।

बहु-उपयोग संकल्पना (Multiuse Concept)

बहु उपयोग संकल्पना का अर्थ यह है कि संसाधनों को केवल एक ही उपयोग में न लाकर एक से अधिक उपयोग में लाया जाय ताकि उनसे अधिक से अधिक लाभ लिया जा सके। भूमि, पृथ्वी का सर्वाधिक महत्वपूर्ण संसाधन है। यदि भूमि को केवल कृषि उद्यान और वानिकी के ही उपयोग में लाया जाए तो केवल उन्हीं की उपज मिलेगी। अतः भूमि सिर्फ कृषि के लिए ही उपयोग में न लाई जाए। खाली पड़ी बंजर भूमि तथा कम उपजाऊ भूमि पर जंगली व फलदार वृक्ष लगाकर छोटे वन तैयार किए जा सकते हैं। इनमें लाभकारी वन्य प्राणी और तीतर, बटेर, मुर्ग और खरगोश आदि पाले जा सकते हैं।

खेतों की मेड़ों पर फलदार वृक्ष लगाकर लाभ कमाया जा सकता है। इन वृक्षों पर पक्षी अपना निवास बनाकर वंश वृद्धि कर सकते हैं।

अभयारण्यों के बाहर तालाब आदि बनाकर मछली पालन किया जा सकता है। जो कि किसानों के लिए लाभकारी व्यवसाय है। अन्य अनेक कृषि वानिकी साधन अपनाकर लाभ कमाया जा सकता है। इस प्रकार वन्य प्राणियों पर अनावश्यक प्रभाव नहीं पड़ेगा।

रीडर (अवकाश प्राप्त) जन्तु विज्ञान विभाग, एस०जी०आर०आर० (पी०जी०) कालेज देहरादून।

प्रवक्ता (अंशकालिक), वनस्पति विज्ञान विभाग, डी०बी०एस० (पी०जी०) कालेज, देहरादून।

Birds of Garhwal and Kumaon

Impact of Climatic and Environmental change

*Bhagat Singh**

Birds are the most fascinating and captivating creatures on our Earth. They have figured prominently in human art and literature. Undoubtedly, they are lustrous ornaments of our forest, and sparkling jewels that float over our lakes, rivers and water courses. They adorn our homes, beautify our gardens and entertain us with their sweet melodies and gorgeous flights.

Majority of people watch birds just because they derive incalculable mental refreshment and joy from this simple pastime. But more recently, bird watching has become a widespread favorable hobby, and even a serious occupation in most of the countries. We now know a great deal more about the miracles of birdlife, yet detailed knowledge, based on facts gathered in fields studies about the habits of various species of birds, need to be disseminated to the people at large.

Birds, by and large, through their evolutionary process, have become more efficient in their ability to survive. Alas! The dangers today increasingly threaten their healthy continuance. How are we to save the survivors to ensure that there are birds for the future generations to see and enjoy?

Uttarakhand, which comprises Garhwal and Kumaon regions, is the only state not only in India but anywhere in the world, where all the life zones from sub-tropical heat to arctic cold exist within a telescopic distance of 100 kms – Thus providing a dazzling and mind-blowing diversity of both flora and fauna. This picturesque mountain country is endowed with wide and varied natural attributes, which make it a fantasy land, where forest and scenic grandeur predominate in exuberance, density and diversity. The wide spectrum of bio-geographic diversity of this region is fully reflected in its spectacularly rich birdlife.

This region's snow-clad mountain ranges, hills covered with mixed forests right up to their crest, sparkling lakes overflowing with perennial water cascading waterfalls, vast stretches of grasslands, interspersed with clusters of trees and shrubby patches, luxuriant growth of lush green grass, and glistening pasturelands provide eternal home to a large multitude of birds.

Many of the most colourful and characteristic birds, such as Monal, Chakor, Koklas and Chir pheasants, partridges, Thrushes, Woodpeckers, Pigeons, Finches, Minivets, Tits, Warblers etc. inhabit the well-forested areas of this region.

Since this region has a tremendous altitudinal variation, the climate here greatly varies from sub-tropical heat at the base of foothills, through intermediate ranges of temperate and alpine, to the arctic cold of the snowy mountains. Because of this drastic change in climatic conditions, there is a different type of plant life at different levels of elevation. Birdlife primarily depends on the type of vegetation that grows at different altitudinal levels or climatic zones.

Most species are resident, and stay here round the year, subject, to, of course, seasonal altitudinal movement; while some strong flying birds, such as Woodcock, Indian Blue Chat and pied Ground Thrush, which are resident of this mountain land, take long journeys to the Nilgiri Hills in South India to spend winter months in warmer regions, and return to their original areas in this region in summer, where they breed and raise their young ones.

I have been involved with birds in this region for over three decades. It is being observed that westward moisture-laden winds that move along the Southern face of Himalayas are not precipitating into rains to the extent to which these used to be earlier, when they reach Kumaon and Garhwal mountains. As a result, this region is gradually receiving less rainfall. Not only are the rains delayed, even the rainfall has become indefinite in recent years. Further more, this mountainous region is witnessing less snowfall during winter months. The snowline is also gradually receding, and has, in general, moved up from 6000 ft. to above 9000 ft. elevation. Even the period of snowfall has not only become indefinite, it has moved from November to January in general. All this change is perhaps

taking place because of some natural phenomena which only scientists can explain. Many glaciers in this region have become dead, and many more are receding back at a fast pace. As a result, a large number of streams and waterfalls remain inactive during the major part of the year.

Since climate of this region is primarily governed by the amount of snow and rain it receives during the year, Garhwal and Kumaon mountains, particularly the temperate region, is gradually witnessing a change in climatic conditions. This accounts for the change in vegetative growth, which, in turn, affects the birdlife that thrives there. Change is the rule of Nature. The overall impact of this climatic change is that there has been a steady decline in bird population in recent years.

The plant life in many areas and tracts is not receiving the amount of moisture needed for healthy growth of trees, bushes, shrubs and grasses. This is particularly true in respect of temperate regions, which harbor the largest number of birds; for the vegetative growth here provides plentiful food in the form of insects, seeds, flowers and fruits to the birds.

Temperate Forests could broadly be divided into coniferous and broad-leaved woodlands. Food supply in these forests is marked with the seasons or climatic conditions. This has an overwhelming effect on birdlife. The trees get new growth in spring and produce fruits in autumn. Insect larvae, it is well-known, grow best on tender leaves. In summer, some insects are more abundant. However, both of these become scarce, if there is a change in climatic conditions for want of moisture either due to death of sufficient rains at the proper time or if the rains are delayed for any reason. Since majority of species of birds in temperate forests are omnivorous, they face acute shortage of food - both insects and seeds. Since March to May is the main breeding season for most of the birds, particularly the smaller ones, in the temperate region, many of them do not undertake breeding activities. Birds, no doubt, are intelligent creatures. They are conscious of the fact that, if there is scarcity of food, they will not be successful in their breeding responsibilities. Birds know that they need more food even for egg formation. Further, they are well aware of the fact that they would need much more quantity of food in the form of insects or seeds for feeding their young ones and for successfully raising their family.

Some birds such as Tits, Jays and Nuthatches store seeds in large quantities in tree holes, and use them during the period when food, for any reasons, becomes scarce.

Woodpeckers are characteristic birds of Temperate Woodlands. They mostly extract beetle larvae from behind the barks of tree-trunks with their long tongues, which have barbed or sticky tips. Many of them also eat seeds, if the need be.

Some birds of Temperate Woodlands, such as Woodpeckers, Owls, tits, Redstarts, Nuthatches, some Flycatchers and Warblers nest in holes in trees. These birds raise large broods, because their nests are relatively safe from predators, such as large birds and ground mammals. Large broods need more quantities of food. Food primarily depends on climate, which, to a great extent, depends on natural attributes, like rainfall and snow. Change in climate adversely affects the food supply for birds, both in the form of insects and seeds. If the food is scarce during the breeding season, the parent birds are not able to feed the chicks properly. As a result chicks become weaker, and some of them die, even before they become young and are able to leave the nest. Change in climate in recent years greatly accounts for the fast decline in bird population in Garhwal and Kumaon mountains.

The wide range of animal life in temperate forests resulted in a number of predatory birds, such as Eagles, Owls and Hawks etc. These birds kill both birds and small mammals. There is a decline in the population of mammals too. As a result, the predatory birds have no option but to make short work of the nests of smaller birds, for their survival.

Secondly, with huge explosion in human population in Garhwal and Kumaon in recent years, large tracts of forests, particularly in Temperate regions have been cleared for human settlements, cultivation of crops and building of roads. This accounts for large scale destruction of traditional and natural habitats of birds. This factor is also responsible for decline in bird population. There has been ruthless onslaught on forests for extracting wood for buildings, for us as fuel, and for the purpose of fodder for domestic cattle. These activities are still continuing unabated, in spite of the restrictions

imposed for protection and preservation of reserved forests. As a result, the birds are gradually losing their natural habitats, food and nesting sites.

At the base of the foothills of Garhwal and Kumaon, there is a rich growth of sub-tropical forests, which provide richest and most exciting habitats to the birds. The trees in sub-tropical areas are often very tall with closed canopy on the top. The forest here harbors a rich variety of species, both of birds and plants.

There is a great diversity of trees in these forests, but all the individuals of the same species flower together at a marked time of the year. This remarkably wide spread flowering almost the year round supplies fruits and seeds to a great majority of species of birds at all the times of the year. Even the birds specialized to feed on nectar are able to survive. This is also true of fruit-eating birds such as Pigeons, which need plentiful supply of fruits round the year.

These forests harbor a large number of species of birds. Most of the bird activity in these forests goes on in the canopies of trees, where leaves, flowers, seeds and insects are.

Birds, nesting in these forests, face many enemies. So several smaller species hang their nests from slender tips of branches or from creepers to make it difficult for predators to reach them. They also make domed nests so that potential predators are not able to see eggs and chicks in them.

For quite sometime past, large tracts and areas of forestlands all along the base of the foothills of Garhwal and Kumaon were ruthlessly cleared and agricultural farms, on a large scale, were established, as a part of green revolution in the post-independence period. With the advent of mechanized farming in agriculture, use of chemical fertilizers came into practice to increase production of crops. With the passage of time, use of chemical fertilizers increased tremendously. For reasons known to agricultural scientists, this gave birth to a great variety of insect pests, which swarmed the crops. The situation became so alarming that pesticides came into use on a very wide scale to destroy the pests. The overall situation has come to such a state now that no crops can be saved without extensive use of pesticides. Most of the species of birds there are either insectivore or omnivores. Chief diet of these birds consists of insects. They started taking in insects killed by pesticides. This adversely affected their health, and with the passage of time, their number started declining at a fast pace.

In addition to above, with the formation of Uttarakhand as a separate State, a large number of industrial units cropped up at the base area of foothills. The State of Uttarakhand earmarked the two districts of Hardwar and Udhampur as industrial areas, and granted certain concessions for setting up industrial units there. The land use for agriculture was converted for setting up industries. On one hand, land for agricultural use has shrunk in area, and on the other, trees and hedges in the area have been cleared. This adversely affected the food supply of seed and grain eating bird, and also destroyed their nesting sites.

Apart from this, the industries are emitting pollution day and night. They are polluting both air and water. There are plenty of ponds, lakes and water courses in the base area of the foothills. All these provide food and shelter to the water birds. As a result of the polluted water, the population of water birds in the region has also been declining.

What is true in case of birds may also be true for us. We can not live a healthy life independent of our natural environment. Birds in this context perform an invaluable function. They warn us, by their health and well-being of the dangers that threaten us in the environment. Several species of birds have become extinct or have miserably dwindled in numbers, as a result of pesticide residues in the environment. We too are absorbing all kinds of chemicals into our own bodies, which have unpredictable side effects, fraught with dire consequences for our healthy growth. This is high time that we take concrete and effective action to stop all toxic substances getting into the environment. If we are able to put a halt to this terrible decline, we will have the satisfaction that we are helping ourselves as well as these magnificent winged creatures.

Conservation of birds is, therefore, a matter of great concern. Each one of us owns the responsibility to conserve and protect the miracles of birdlife that thrives on our planet.

All of us need to associate ourselves with the future of birdlife. We need to appreciate the

It is true that by bird watching we can not earn our livelihood. But if we cultivate the hobby of bird watching, it would certainly prolong our life; for it would stimulate our heart and mind to step-into the all prevailing serene wilderness where we can breathe fresh air, seek peace and tranquility, break the dull and drab monotony of the present day city life, where we can relax our nerves in the natural setting, free from tension and pollution and soothe our depressed feelings in an environment, that throbs with the fragrance of wild flowers, with the melodious songs of a great multitude of birds, with the fragrance of wild flowers, with the exhilarating dance of lofty trees, with the glimmer of trickling water springs and the enchanting tunes played by the orchestra of numerous waterfalls descending down the forested hills.

It is difficult to find a common ground between the two different approaches. The first approach is based on the idea of a common ground, which is a shared understanding of the world. The second approach is based on the idea of a common ground, which is a shared understanding of the world.

William Hazlitt

Thomas Merton

Michael Jordan

Percy B Shelley

From the archives of Cheetal

The Importance of Sanctuaries (Including National Parks) in the Conservation of Threatened Species of Large Mammals in South and East Asia

E.P. GEE

(Based as a paper read by the author of the Conference on Conservation of Nature and Natural Resources in Tropical South East Asia at Bangkok, Thailand, November 29 to December 4, 1965).

Summary

Due to pressure from human population and ever insistent demands for more lands, sanctuaries in South and Southeast Asia are of inestimable importance for preserving rare and endangered species—especially the larger mammals. With poverty, hunger and often illiteracy as prevalent as they are, the main emphasis should be on the economic or tourist value of wild life. The co-operation and assistance of the local inhabitants are vital if any progress is to be made in nature conservation, and some practical methods of ensuring this co-operation are discussed, including buffer zones, publicity and education, and provisions of local amenities.

While legislation for giving total protection in all places to the larger endangered species is necessary, the difficulties of enforcing such legislation in emergent and development countries makes it all the more imperative to preserve these rare species in sanctuaries. Sanctuaries, then, assume an even greater importance in developing countries—especially in those where there are pressing and ever increasing demands by a growing population for more land for opening up for grazing of domestic stock, for agriculture and for human settlement.

Such pressures from human population are generally much greater in Asian countries than in North America and Africa. Therefore sanctuaries in Asia are usually smaller in size and require more management and greater protection.

In South Asia, the preservation of the blackbuck and the greater Indian bustard in the wide open cultivations and waste areas is a problem: can sanctuaries or national parks be created to save them? The Indian rhinoceros has so far been successfully preserved from extinction in Kaziranga, Jaldapara and other sanctuaries of Northeast India, but vigilance has to be maintained not only against poachers but also against intrusion by grazers, cultivators, and others. The Gir Forest, stronghold of the Indian lion, greatly needs the status of a sanctuary or national park for its survival. Dachigam in Kashmir also needs to be given better protection and legal status, otherwise the rare and vanishing Kashmir stag may be lost to the near impenetrability of the floating humus on its corner of the Logtak Lake; while the Burma subspecies, living on drier and undulating land, is believed to be somehow surviving in fair numbers.

In Southeast Asia, the Thailand subspecies of the brow-antlered deer needs rescuing from extinction either in a sanctuary or in some appropriate place where it can survive and breed successfully. The Ujung Kulon Reserve in Java appears to be in urgent need of more effective protection, if the Javan rhinoceros is to be saved from extinction. Sanctuaries need to be created for the Sumatran rhinoceros, to include the largest possible number of them in any known locality, or at any rate a large and suitable area in some place, where full protection can be more easily given, needs to be set aside into which this species could be transplanted. The anoa and the tamarau in Celebes and Philippines are similarly in need of preservation, and the orangutans of Sumatra and Borneo require close attention. In a lesser degree of urgency, but soon to require protection, are the seladang, kouprey, Malayan tapir and others.

Where poverty, hunger and often illiteracy are prevalent among the local people, it is mostly of no avail to stress the importance of wild life and wild places on aesthetic, cultural and scientific grounds.

The main emphasis should always be on their economic value; in other words it should be emphasized that rare wild animals are of infinitely greater value to the local villagers if kept alive in their natural habitat than if killed and eaten. Wild animals, especially rare ones, in their natural surroundings will attract visitors from nearby cities and tourists from abroad, and thus provide the necessary revenue and foreign exchange for the sorely needed development and elimination of the very poverty, hunger and illiteracy which everyone wants to remove.

The problems of preserving rare species of wild life in existing or proposed sanctuaries in South and Southeast Asia are mainly political and administrative, and only in a lesser degree are they scientific or ecological. The staff of the department concerned with protecting a sanctuary, whether it be the Forest or some other department, and the local civil authorities including the police, will find it extremely difficult to enforce laws unless these laws are carefully drawn up and unless the full co-operation of the local villagers is first obtained.

Drawing on experience gained at Kaziranga Sanctuary in Northeast India, where the great Indian rhinoceros is preserved, it has been found that the creation of a buffer zone around the sanctuary of varying width, in which no firearms or others weapons may be used crops from vermin, has done a great deal to keep away poachers coming from outside for while those living inside the buffer zone can be more carefully watched and controlled. Such a buffer zone can, if necessary, contain villages, cultivations, grazing grounds and as on as in the case of Kaziranga, though the ideal buffer zone would naturally be one devoid of such human activities.

To ensure the co-operation and assistance of the inhabitants living and working in the vicinity of a sanctuary - so that it will be easier for the authorities concerned to administer and protect the place and the wild life therein - the importance of publicity and education to ensure tourist attraction must be emphasized, for no hungry or impoverished person can consider an edible animal as something beautiful or scientifically interesting.

Under a democratic set-up, the local members of the legislature who live near a wild life sanctuary or national park must be convinced of the long-term economic advantages of wild life resources, so that they may resist local demands for immediate short-term exploitation of these local resources. In other words, it is essential that the right kind of publicity be done in such a way that the local members of the legislature may themselves spread the gospel of nature conservation among their constituents. Basically, and by the democratic way of thinking, animals belong to the people of the area in which they exist and could well be regarded by them as living money earners. As such the local inhabitants living on the fringe of a sanctuary should be the protectors of this valuable natural resource rather than the destroyers of it. It is significant that poachers of the rhinoceros in Kaziranga cannot operate on the edges of Kaziranga; they are forced to do their illegal killing secretly and in the remote interior, away from and unknown to the local inhabitants who would resist such interference from outsiders.

Local human populations adjacent to a rare species of wildlife should be induced to take pride in their accidental trusteeship, so that they could then proudly boast of being the sole custodians of the only survivors of that species in the world as has already happened in at least one place known to the writer.

In the event of a rare species having to be captured and transplanted to a new area more suitable for its supervision and protection, as might happen in the case of the Sumatran rhinoceros, it is even more important to enlist previously the support of the local population. In such a case the local villagers, being unaccustomed to the presence of a strange species which could be considered as usurping their land and which might cause damage to their crops, have come to realize that crop growing in the vicinity of a sanctuary is an occupational hazard which must be accepted with good grace. They must also be persuaded to create new conditions of wild life as a potential neighborhood, to accept the new situation with its land requirements and risks, in their own as well as in the national interests.

In order to more easily convince the people living in the vicinity of an old or a new sanctuary that wild life and wild places are revenue earners for the people of the country as a whole including themselves, it is suggested that there be some concrete, practical and useful proof of the fact that

revenue, is, in fact, coming in from the wild animals. There must be some proof that although a sanctuary is locally run at a financial loss, yet there is a profit from tourism in the country as a whole. Such proof can be given as follows: instead of all the revenue derived from tourism and wild life being lost in general country wise expenditure, at least some part of it should be allotted for special and extra development in the vicinity of the sanctuary from where some of it came. In other words a special school, a special clubhouse, a special drinking water supply or suchlike construction in the neighborhood of the sanctuary, in addition to the normal development work which is going on in the district, publicly proclaimed as being the result of funds derived from the rare species or sanctuary concerned, should create a very favourable impression on the local people.

It is with the co-operation of the local villagers that many of the endangered species and their sanctuaries depend, and it is mainly by such simple and practical methods that underdeveloped peoples can be persuaded to become conservation-minded.

Elephants in Our Lives

In all ancient cultures, forces that are bigger and more powerful than human beings have been worshipped as gods. For instance, temples have been dedicated to the sun, the moon and other forces of nature. Elephants too have always been an integral part of India's myths and folklore, history and cultural heritage. Reference to the elephant date back to the Rig Vedas, the earliest Vedas, where the word 'elephant' was often used as a simile with reference to someone's size and strength, such as, 'as strong and big as an elephant'.

Protecting and ensuring the survival of elephants means more to us than protecting just another 'endangered species'.

Elephants as Gods

The fact that elephants features a great deal in Indian mythology is not a surprise. In some cases, the God is the elephant, and in other cases, the God rides on the elephant.

The best example of the first, as we all know, is the elephant-headed God, Ganesha. Ganesh, or Ganesha is a popular Hindu God, and is believed to be the remover of obstacles and the harbinger of good fortune.

The Jataka Tales, the stories of Buddha's former births, include many stories about elephants. One of them explains that the Great Being, Buddha was born in the body of an elephant. Another story talks about Buddha being born in an elephant trainer's family. Buddhists believe that touching an elephant achieves enlightenment, and so many monasteries in Thailand, Kampuchea and Vietnam keep elephants.

Elephant in Mythology and Literature

Elephants in the Vedas

In the Vedic texts of about 800 B.C., an elephant (*hastin*) is recommended as a gift. Since one cannot gift an elephant without owning it, this suggests that during that period, elephants had been domesticated.

The Vedas also include actual field observations of elephants, such as elephants in *musth*, or of an elephant being tormented by flies, indicating considerable familiarity with them. It seems therefore, that even in the earliest Vedic period, which perhaps overlaps the period of the late Harappan culture, elephants were domesticated. The possession of an elephant was, in fact, a status symbol, and elephant-keepers or owners (*hastipa*) were a recognized category of workmen.

The Jataka Tales

Jataka Tales are the stories of Lord Buddha's former births. These tales provide an insight into elephants, in our lives and are the best surviving collection of folklore in any literature of the world. It is believed that these stories were compiled towards the end of the second century B.C. The *Pali Jataka* stories, that are thought to be older than the Jataka stories, give an insight into the status of the

elephant during the period of 600 to 321 B.C. (the period before the emergence of the Mauryan Empire of Chandragupta Maurya).

The *Jataka* stories also refer to various elephant festivals. Some of these festivals still survive and are a part of the tradition of southern India. In these festivals, elephants are displayed and processions of elephants are organized.

One of the *Jataka* stories about Buddhisatta, the Great-Being, describes how Buddhisatta tried to protect a *quali's* family from a rogue elephant but was not successful in doing so. According to another story, the Buddhisatta was born as a white elephant in the Himalayas. This elephant was the leader of many elephants, (one version indicates the number as 80,000 and another as 8000). These stories imply that elephants were found in large numbers in the Himalayan region. Ironically today, less than 100 elephants are found in this region today, which is the present day eastern Uttar Pradesh and northern Bihar.

Elephants in the Epics

The two great Indian epics, the Ramayana and the Mahabharata, describe Indian society of 1000 to 700 B.C. Both these epics abound in references to elephants in the lives of people, in war and in peace. In Ramayana, many similes of elephants have been drawn to describe strength. Flourishing cities are described as ones full of elephants, bulls, cows, horses and other domesticated animals, as these are all considered signs of wealth. Ramayana has very few descriptions of elephants in battles or in combat, though it does have descriptions of monkeys being trampled down by elephants or by chariot wheels in battle. As compared to the *Jatakas*, the Ramayana has more detailed and accurate information on elephants. It also has interesting references that give on insight into the contemporary mode of capturing elephants.

Tamil Literature

Elephants have been a part of the culture and life of the Tamils since the Sangam period (1st to 3rd century A.D.). Tamil literature provides a wealth of information about elephants. Nigandu, the old poetical dictionary, has 44 names for elephants, four separate names for female elephants and five for elephant calves. In it each part of the elephant body is separately named.

Kautilya's Arthashastra

In the Royal courts of the Indian kings, the study of elephants, elephantology, was considered as a branch of Arthashastra. Kautilya's Arthashastra prescribes the duty that the elephant mahout has towards the care and the training of his/her elephant. The Arthashastra recommended that while elephants be eliminated from river valleys under settlements, they should be offered complete protection in the outer hill forests. It also recommended that elephant sanctuaries be set up, with guards protecting them, at the periphery of kingdoms. A very interesting instruction in the Arthashastra was that elephant calves, elephants with small tusks, tusk less males, diseased elephants, female elephants with their young and suckling females should not be captured, though it did allow capture of an elephant older than 20 years.

Hastayurveda

Palakapya's Hostoyurveda (Treatment of Elephants) was written around the end of the 10th century AD. Gajayurveda, or Hostayurveda, is the science of treating elephant diseases. According to folk tradition, it is believed that the mother of Palakapya, the compiler of the treatise, was an elephant. Palakaya grew up with wild elephants and ate all that they ate. He spent so much time with them that he became an expert in treating the ailments that afflicted elephants. It is believed that after some time, he settled on the banks of the river Lohiya, at the top of the Brahmaputra valley. It was there that he compiled the treatise on the breeds of elephants and on the diagnosis and treatment of elephant

diseases. This compilation was later known as *hastayurveda*.

Domesticated Elephants

The earliest known domestication of elephants dates back to the Indus Valley Civilization, over 4000 years ago. However there is a possibility that elephants were tamed even earlier than this in southern India and Southeast Asia.

There are also indications that domestication of elephants was indigenous to India, and that the Aryans picked it up.

One of the stories in *Pali Jatakas* speaks of the 'elephant state' and elephant trainers. It talks about how an elephant was tied to a post for training and being unable to bear the strain, it broke the post down and ran away to the forest. Incidents of trained elephants escaping into the forest are common even today.

For hundreds of years elephants have been captured and trained in Asia for performing various roles, e.g. in lumber operations, for transport, for religious purposes, for wars etc. A number of elephant capture techniques exist, though all have consequences for the well-being of the captured animals.

Elephants in War

Elephants have been used as war machines for years. Elephants were probably used for the first time in war in Asia. By 500 B.C., the use of war elephants was widespread in the Middle East. A war elephant was generally equipped with five plates of iron joined together with rings. These were then fastened around the elephant's ears and head by chains. It also had a howdah on its back that was used to carry spearmen and archers.

Symbolic Elephants

Elephants can be seen on the gold coins of Kumaragupta. Though they are uncommon on the coins of the Imperial Guptas, they are uncommon on the coins of the Imperial Gupta, they are not completely absent. Elephants, because of their size and reputed wisdom, have been used to symbolize human qualities in many ways.

In early Buddhist literature, iconography, art and in decorative motifs, there was a shift from the horse culture of the Vedic period, to elephant culture. In India, even today, on a Rs. 10 note, one can see an elephant motif. This shows the high esteem in which elephants are held in our country.

Elephants in Art

Elephants are among the most popular icons in our art forms. One can see images of elephants in various art media. Artists from all over the world have captured impressions of elephants in their paintings. This holds true for artists of all times, from the era of the cave paintings to those of present day modern art.

Working Elephants

Today domesticated elephants are based for many purposes, including.

- As pack animals, as used in the Vietnam war.
- In the logging industry, to carry and load small or medium sized logs into trucks and trailers. These logs are then transported to the work site.
- To add dignity and stature to ceremonial and religious processions.
- To entertain people in village festivals and circuses.
- In nature tourism where roads are limited and where waling in the forest could be dangerous.
- By the Forest Department for patrolling.
- In temples, monasteries, etc.

Climate plays an important role in the number of hours an elephant can be engaged to do productive work. In the cool mountain districts of India, Thailand and Burma, a healthy tusker can work for up to

eight hours, but in lowlands they can generally work for 5 to 6 hours with intermittent breaks.

Caste System in Elephants

Have you ever looked at an elephant carefully? Though they all have a trunk, two large ears, a huge body and two pair of strong legs, no two elephants are similar in their body structure.

In India, elephants have historically been classified by their build. There are two main bands or castes in Indian elephants – Koomeriah and Meergah. Koomeriah elephants are short and thick and are believed to have immense strength. Elephants in this caste are believed to be royal and princely. Meergah elephants are long legged and light and can run fast. It is believed that there is another caste of elephants, the Boomeergah which is a blend of both the Koomeriah and Meergah. These elephants are believed to be a combination of both strength and speed.

(based on Mark Shand, Queen of the Elephants Vintage, London 1996)

Elephants Entertainers

Many children discover "E" for Elephant very early in life when they start learning their alphabet. This process goes on, with children coming across elephants in books films, stories, poems and proverbs. Many children might also relate to Appu, the elephant mascot of the 1982 Asian Games.

Elephants have entertained people for years. It is their gentle nature, strength and intelligence that has motivated people to tame them and train for various acts and shows. Along with other animals that form an integral part of the circus, elephants have been a part of circuses, since the circus began in the days of the Raman Empire. For generations, adults and children have marveled at the strength, skill and size of elephants.

At the circus, one can see elephants do balancing acts and complex dance routines to amuse people. Some elephant trainers have also trained their elephants to walk on their hind legs or balance a huge ball. Today, society is becoming increasingly sensitive to the use of animals in such entertainment. It is felt that the silly tricks that elephant are made to do might not only injure them, but also lower the dignity of the animal and may break their spirit. It is seen as cruel and shameful to degrade such majestic animals by making them do such tricks.

Elephants are the best crowd pullers in any zoo, especially in case of a baby elephant. Elephants are also used in different parts of the world for a variety of competitive sports like elephant polo, elephant score, elephant tug-of-war and elephant racing games.

The Ceremonial Elephant

In India, many ceremonial functions seem incomplete without the presence of elephants. Elephants also seem to enjoy every minute of the love, admiration and respect that they get from the visitors at any ceremonial function, festival or ritual.

Trichur Pooram festival is one of the biggest festivals of southern India. It is a festival when the biggest tuskers take centre stage. It is a festival of music, of elephants, of fireworks and is sometimes also referred to as the 'festival of festivals'.

Elephants are a part of ceremonies and festivals not only in India but also in other countries like Sri Lanka and Thailand. These ceremonies symbolize people's esteem for the magnificent jumbo.

One such annual festival takes place in Sri Lanka in the week before the full moon in August. This festival has been a part of the tradition for over 500 years. During this festival, the country's finest tusker dressed in his best and accompanied by 200 beautifully dressed elephants, carries the sacred Tooth Relic of Buddha in the streets of the hill capital, Kandy.

Another important elephant spectacle takes place each November in Surin, Thailand. This festival is more of holiday, or May Day for working elephants. Elephants play many games-football and tug-of-war to name a few.

Elephants and Nature Tourism

Nowadays National Parks have been successful in creating opportunities for people to take up elephant safaris and venture into the jungle on an elephant's back. This has helped the National

Parks turn into major tourist attractions. Nowadays, tourists at National Parks can be seen photographing and observing other animals from an elephant's back. The howdahs on the elephants have been modified from the olden ones, into comfortable seats, with no cover on the sides, so that the visitors can have an all around view of their surroundings.

This not only helps create interest among people on the need to preserve the rich and diverse flora and fauna in our country, but also helps in the protection of elephants. Taken into nature tourism, elephants have the advantage of both being in the wild, and also being taken care of by the mahouts. Some people are of the view that it is incorrect to keep any animal in captivity, for every species on this earth has a right to survive and live according to its own will. While considering this question, it is important to remember that elephants are deeply embedded in our tradition and this is one factor that governs their survival today.

क्या कीड़े-मकोड़े भी सांस लेते हैं?

धरती के सभी जीवित प्राणी सांस लेते हैं। सांस लेने की क्रिया में वे आक्सीजन शरीर के अंदर ले जाते हैं और उसके बदले दूसरी गैसों बाहर निकालते हैं। जीवित प्राणियों में सांस लेने के कई तरीके हैं जैसे मनुष्य फेफड़ों द्वारा सांस लेता है, मछली गिल्स द्वारा सांस लेती है, कुंघआ त्वचा द्वारा सांस लेते हैं, कीड़े-मकोड़ों द्वारा सांस लेने की क्रिया बड़े विचित्र ढंग से होती है।

कीड़े-मकोड़ों के पेट की संरचना बड़ी विचित्र होती है। यदि हम किसी कीड़े को उलट कर उसका पेट ध्यानपूर्वक देखें तो हमें उसमें अनेकों छोटे-छोटे छेद दिखाई देंगे। प्रत्येक छेद का सम्पर्क इनके पेट में स्थित एक नली से होता है। यह नली हमारी सांस नली के तरह काम करती है। अतः कीड़े-मकोड़े हमारी तरह ही सांस लेते हैं, अंतर केवल इतना होता है कि हमारी शरीर में केवल एक ही सांस नली होती है, जबकि एक कीड़े के पेट में सैकड़ों सांस नलियां हो सकती हैं, ये नलियां बहुत ही पतली होती हैं और अधिक स्थान नहीं घेरती हैं।

सांस लेने की दर कीड़े के आकार पर निर्भर करती है। बड़े आकार के कीड़े-मकोड़ों की सांस लेने की दर मंद होती है। यह तथ्य सभी प्राणियों के लिए सत्य सिद्ध होता है। उदाहरण के लिए हाथी एक मिनट में लगभग दस बार सांस लेता है, लेकिन चूहा एक मिनट में दो सौ बार सांस लेता है।

News & Views

Retired IPS officer with distinguished Service record joins WPSI as its Chief Patron



Mr. R.K. Mehta a retired IPS Officer of Himachal Pradesh Cadre who actively took part in counter insurgency during terrorism in Punjab and worked closely with Mr. JF Rebeiro and Mr. KPS Gill and was witness to Indo-Pak Shimla agreement signed by Smt. Indira Gandhi and J.A. Bhutto, has joined as a Chief Patron of WPSI DDun. Apart from a generous donation of Rs. 25000/-, he will be a guiding force for our Society. He has the distinction of personally leading the successful operations against hardcore terrorists who had committed the famous 5 Crore bank dacoity at Ludhiana in 1987. He was a member of Broad Based Board of CBI for monitoring inter state and international ramifications of terrorists. He worked as IGP in North Western sector of CRPF and administered about 240 Coys. He has the distinction of working with SSB organization during mopping up operations in J&K in 1965 Indo-Pak war under General Dunn and General Sparrow. He has a vast experience of dealing, with various kinds of law and order. situations and underwent a wide range of training courses ranging from intelligence collection, weapon training, guerrilla

warfare to top management courses. Mr. Mehta is a highly decorated officer who has received Presidents Police Medal twice, Samar Seva Medal, Raksha Medal, Sangram Medal, Kathin Seva Medal, Independence Anniversary Medal, Bar Hard Duty Kathin Seva and Director Generals commendation Disk apart from several appreciations and commendations from State Govt., Election Commission and others. Wildlife Preservation Society of India Dehradun is highly honored to have Mr. Mehta as its Chief Patron.



*Mr. R.K. Mehta (in uniform) at the occasion of signing of Shimla agreement.
The young lady is late Benazir Bhutto*

Book Review

Yet another very interesting book on birds by Bhagat Singh, life member of our Society has been published by Unicorn Books. The book entitled **“Life Cycle of Birds”** has a forward by Sri Samar Singh former Secretary to the Govt. of India and Secretary General WWF – India. This book comes soon after his very informative book “Uttaranchal – Land of colorful Birds” very well received by bird lovers. The 195 pages feature several outstanding true to life photographs of different bird species nesting, incubating, rearing and caring their young ones in their natural habitat. The information on the life cycle of several important birds has come after his patient observation and crystal clear photography of several years of outdoor ventures. The information along with unique photographs will be very valuable to the bird lovers who are keen to know more about the birdlife. The passionate and abiding interest of the author makes this as a special book on birds.

Editor

The Indian National Trust for Art and Cultural Heritage (INTACH)

Bulu Imam
Regional Convenor
Hazaribagh Chapter
Tel: 06546-264820
Fax: 06546-270815

Sanskrit
Dipugarha
Hazaribagh-825301
Jharkhand, India

Email: rch_buluumam@sanchartnet.in
Website: www.sanskritihazaribagh.com

Mr. Jairam Ramesh
Minister for Environment and Forests
Government of India, Ministry of Environment & Forests
Paryavaran Bhavan,
CGO Complex, Lodhi Road
New Delhi-110 003, India.

25th June 2010

Sub: Three million kms of new roads to be laid in India by 2012.

Dear Mr. Jairam Ramesh,

I am extremely worried about the report that 30 thousand kilometers of new highways are to be laid in India over the next two years. This is primarily because from what we have seen new highways entail the clear-felling of the old trees planted along side the comparatively narrow roads laid down a century ago which are being widened. Hundreds of such projects are at present going on, and I have already written to you with regard to the widening of National Highway 33 between Ranchi and Hazaribagh in Jharkhand where massive clear-felling of roadside trees is taking place. It has been estimated that 80,000 trees will be destroyed. These are the finest old growth trees in India and include fruiting trees such as Mango, Tamarind, and Jumun and sacred trees like Barh and Pipal, all about 100 years old. The idea that 30 lakh kms of such highway development projects across India, cutting down upto 800 trees a kilometer is staggering. The cutting of these trees will not register in the forest cover of India cutting down upto 800 trees a kilometer is staggering. The cutting of these trees will not register in the forest cover of India statistics. As you know for cutting a tree or two the Forest Department has put thousands of Indian villagers into Jail, many of whom languish there without recourse to bail. here in Jharkhand I have learned of several new road widening projects taking place,

and am informed that the road from Hazaribagh to Bagodar on NH2 is also scheduled for widening and tree felling. This road runs through the watershed of the Damodar river which is one of the most pristine jungles in India.

I would like to impress upon you that environmentalists are not the enemy of the government but they are the enemy of the people who want to cut all the age-old trees of India and have no concern for the environmental and social costs whatsoever. The roadside trees which are being cut don't represent the finest trees in India including sacred trees like Barh and Pipal. It is shocking that the government can even consider cutting down hundred year old trees of these varieties. I request you to urgently have your ministry examine the impact on the environment for cutting down roadside trees. We are reminded that necessity is the plea for every infringement of natural and human rights. Before cutting down trees on roadsides every alternative must be considered. I am sure you will take the matter in great seriousness and see that the proper investigations are made before clearance is given by your ministry. Or am I correct in assuming that the National Highways Authority of India is beyond the reach of your Ministry? I am making this assumption in view of the present day policy of the government that anything which is proposed as national development gets automatically cleared.

Thanking you I remain,

Yours sincerely,

Bulu Imam

INTACH

71, Lodhi Estate, New Delhi-110 003

Phone: 24631818, 24632267, 24632269, 24632269, 24641304, 24645482

Fax: 91-11-2461290 E-mail: intach@de13.vsnl.net.in Website: www.intach.net

Chairman: Gen. L.K. Gupta

More Members join WPSI

The interest in taking up membership of Wildlife Preservation Society of India continued and during the quarter following new member joined the Society. We welcome them and hope that their contribution to the society will go a long way in strengthening it.

1. Mr. Y.C Rai IFS (Rtd.) B – 46 Mandir Marg,
Mahanagar Extension Lucknow, Life Member
2. Mr. Jaideep Dutta, Chartered Accountant
23/ 18, Teg Bahadur Road, Dehradun Life Member
3. Mr. Suniti Bhushan Datta
Naturalist / Photographer, 154 Lane No. 2
Turner Road, Clement Town, Dehradun Life Member

4. Miss Neha Pandey D/o Sri J.B. Pandey
Sewala Kalan, Chandrabani, Mandir Marg
PO Mohobeywala, Dehradun(Membership Renewed) Member
5. Miss Urishila Lohani D/o Dr. P.K. Lohani
3/36 Ashirwad Enclave, Dehradun Member
6. Mr. Vipin Jhinkwan, Student of B. Com
HNB Garhwal University, Srinagar, Garhwal Student Member
7. Miss Sounkia Karmakar, Student of M Sc. Forestry
Room no. 5, A Block, New Rosewood Hostel,
FRI University, Dehradun – 248006 Student Member
8. Miss Anindita Bidisha Chatterjee
Room no. 4, A Block, New Rosewood Hostel,
FRI University, Dehradun – 248006 Student Member
9. Mr. Falguni Behera, Student of M Sc. Forestry
Shisham Hostel, Room no. 75
FRI University, Dehradun – 248006 Student Member

More Donations Received by WPSI

The following members have very kindly donated the amount shown against each for the Society. We thank the members for their benevolence and hope for their continued cooperation.

1. Maharaja Madhu Sudan Singh of Bhavnagar (Gujarat), Life Member
5000/-
2. Dr. H.S. Rose, Patiala Punjab, Life Member
501/-
3. Sri Digamber Gadgil Life Member
500/-

AN EARNERST APPEAL IS BEING REPEATED TO OTHER MEMBERS TO DONATE GENEROUOUSLY TO IMPROVE THE FINANCIAL CONDTION OF THE SOCIETY. DONATION MAY BE MADE BY CHEQUE/ DEMAND DRAFT IN FAVOUR OF PRESIDENT WILDLIFE PRESERVATION SOCIETY OF INDIA, DEHRADUN.

Opham: A Gandhi of the Indian Jungle, The Independent, UK

He is a brilliant, spiky, stubborn Indian Muslim who has devoted his life for the past two decades to defending the rights and culture of tribal people of the state of Jharkhand, in eastern India.

His peaceful home amid high forest trees on the outskirts of the town of Hazaribagh, thronging with children and small animals, is a sort of Fresco University for anybody interested in sharing the wealth of his capacious brain and crossing swords with him over the great issues of the day.

So deeply buried was he in the Indian bush that we thought Bulu Imam, his museum of tribal art and his cottage industry of books, essays, poems etc. would remain a treasure known only to a few. But now he is on the verge of fame, it is reported that he is in line for the International Peace Award awarded annually by the Gandhi Foundation.

Imam is the grandson of an Indian high court judge who was also a President of India's Congress Party and as such he is a child of the Indian elite. He spent much of his early life helping his father organize tiger hunts in what is now Jharkhand- formerly southern Bihar, an Indian state with a majority population of Adivasis or tribal people.

As he explained to me some years ago, his view on life was transformed during the journey he undertook across the state with the British travel writer Mark Shand and his elephant. It was vividly borne home to him how the once-pristine jungle of this high plateau was being systematically destroyed by the state mining enterprise for the coal that lay underneath it.

In the process the tribal culture which had prevailed here for centuries was being rapidly wiped out. Though raised as a highly westernized Muslim, Bulu has a strong affinity with the culture of the Adivasi villages partly explained by the many visits he paid to such villages as a young man during the tiger hunts. He also has not one but two tribal wives. With the likely extermination of this culture staring him in the face, he decided to dedicate his life to saving it.

Twice a year, at harvest and at marriage time, the Adivasi women of Jharkhand paint their mud homes inside and out, in a ritual of sanctification which is also a demonstration of rich artistic gifts. Twice a year the paintings are erased and the process starts again, but in 1993 Bulu set up what he called the Tribal Women Artists' Cooperative to encourage the women to value their work and to make money by doing paintings of the same sort on cards which could then be sold. He has travelled the world with the artists, demonstrating the work and gathering support and funds.

He also began an intensive lobbying campaign, telling anyone who would listen, about the beauty and archaeological importance of the Karanpura Valley, the area of central Jharkhand under immediate threat where many caves richly decorated with Neolithic art have never been studied by experts and risk disappearing for ever.

Today Bulu, his family and his friends in the tribal villages that still survive find themselves under siege from three different directions. In addition to the threat from mines, the region has become infested by the Maoist rebels who now have a huge swathe of the forested regions of central India under their control. And since last November the Indian government has decided to seek a military solution to the Maoist challenge, described by prime minister Man Mohan Singh as India's number one security threat, sending in tens of thousands of paramilitaries to hunt the rebels down - and doing further devastating damage to the Adivasis in the process.

"Security in Jharkhand is dead", says Imam. "We are living in an emergency situation of civil war with open loot of the state's coffers and resources. The extremists have also taken the law into their own hands with public executions. It is impossible to have a positive vision for Jharkhand in the coming decade." Peace award or no peace awards, Imam's fears for the apocalyptic end of his beloved region are real.

Giant ice chunk breaks off Greenland glacier

Washington: Andreas Muenchow, a researcher from University of Delaware, has reported that a huge chunk of ice, four times that of Manhattan's size, has broken away from a Greenland glacier. The new island has an area of at least 100 square miles and a thickness up to half the height of the Empire State Building. Petermann Glacier, the parent of the new ice island, is one of the two largest remaining glaciers in Greenland that terminate in floating shelves. It connects the great Greenland ice sheet directly with the ocean.

"The freshwater stored in this ice island could keep the Delaware or Hudson rivers flowing for more than two years. It could also keep all US public tap water flowing for 120 days," Muenchow said. The island will enter Nares Strait and from there, it will likely follow along the coasts of Baffin Island and Labrador, to reach the Atlantic within the next two years, said Muenchow.

Courtesy: Times of India, August 8, 2010

In a first, 'extinct' primate caught on Camera

Rare sight: The Horton Plains slender Loris was first discovered in 1937 but had only been seen four times since then.

A "cute" primate so rare, it was thought to be extinct has been caught on camera in the forests of Sri Lanka for the first time, scientists said on Monday. The Horton Plains slender Loris is a small, nocturnal animal which can grow up to 6 inches long with big, bulging eyes. Endemic to Sri Lanka, it was first discovered in 1937 but had only been seen four times since then. Scientists last caught a glimpse of the primate in 2002, and believed it had since died out. But field researchers, working with the zoological Society of London, tracked down the mysterious creature in the forests of central Sri Lanka. In a world first, they were able to take pictures of an adult male slender Loris sitting on a tree branch.

Courtesy: Times of India, July 21, 2010

A breach of faith in dams

Ongoing violations in projects could ruin our environment. Does the government care?

For the Uttarakhand government, the hydropower story is becoming a case of 'so near and yet so far'. Its dream of building a network of projects on the Ganga has run into yet another roadblock. Last week, the Environment and Forests Ministry's Forest Advisory Committee (FAC) decided not to give clearance to any of the proposed projects until the National Ganga River Basin Authority (NGRBA) conducts a cumulative impact assessment study of all the proposed dams. The decision came after an FAC team, under instructions from the Uttarakhand High Court, found that serious violations had occurred in some existing dams and that the government had inexplicably decided not to do any cumulative study on the effects of building so many dams on the Ganga. Only a couple of months ago, the Comptroller and Auditor General of India warned that there would be no water in large stretches of the Alaknanda and Bhagirathi riverbeds if the state builds the 53 power projects on these two rivers.

Unfortunately, whenever violations are exposed, we are so often presented with a fait accompli. Take, for example, the Lohari Nagpala Hydel Power Project. Even though the Union Minister for Environment and Forests Jairam Ramesh accepts that there have been large scale violations of green laws, he now says that it'll be difficult to abandon it because Rs. 600 crore has already been spent on it. So what happens to the project developer and the officials who were in cahoots with the company? And what about the threat of an environmental disaster in the future? Witness the kind of violations that are taking place in the projects underway. The Srinagar project, according to Bharat Jhunjhunwala, an economist, in his petition to the HC, was cleared as a 200 MW project in 1985.

Then in 1987, it was raised to 300 MW and it was necessary for the project developers to obtain a fresh environment clearance. But no one bothered to apply for a fresh one. Such total lack of regard for the law by the state as well as the central ministry can have far-reaching effects. For example, \$600 million loan for a 444 MW hydropower project in the state may be in jeopardy following allegations about the manner in which it received environmental clearance. In the hills, the protests are increasing and this should be a cause for worry for the state and the Union Governments. How the Ministry of Environment and Forests in particular – and the Government of India in general – handles corporate violations of this magnitude will demonstrate how serious they are about saving our fragile environment – and how seriously they take their own laws.

Courtesy: Hindustan Times, July 19, 2010

'Earth much younger than thought'

London: The Earth is much younger than previously thought, a new study has suggested. Geologists at Cambridge University have calculated that the planet could have taken far longer to form following the birth of the solar system 4,567 billion years ago than it was previously believed. By comparing chemical isotopes from the Earth's mantle with those from meteorites, the geologists have claimed that Earth reached its current size around 4,467 billion years ago, the Daily Telegraph reported.

Scientists have in the past estimated that Earth's development, a process known as accretion where gas, dust and other material clumped together to form the planet, happened over just 30 million years. But a new study claims this process may have taken up to 100 million years – more than three times. The geologists claim that while the Earth probably grew to 60% of its current size relatively quickly, the process may well have slowed then, taking about 100 million years in all. The accretion of the Earth involved collisions between planetary embryos. The heat created by the impacts caused the interior of the governing planet to melt, creating molten the metal core at the Earth's centre and mantle above it. The team used measurements of levels of chemical isotopes created during the accretion, providing a form of geological clock.

"The whole issue hinges on working out how long it took for the core of the Earth to form, which is one of the big unknowns in this area of science", said lead author John Rudge.

Courtesy: Times of India, July 13, 2010

Atmosphere's massive shrinkage baffles experts

Photos reveal Himalayan ice melting at alarming rate

Researchers are baffled by the recent collapse of the upper layer of the Earth's atmosphere. The unexpectedly large contraction of the thermosphere, which blocks harmful ultraviolet rays, has left scientists scratching their heads, NASA announced.

The thermosphere expands and contracts regularly due to the Sun's activities. As carbon dioxide increases, it has a cooling effect at such high altitudes, which also contributes to the contraction, the CNN website reported on Saturday. But even these two factors aren't fully explaining the extraordinary contraction which, though unlikely to affect the weather, can affect the movement of satellites, researchers said.

"This is the biggest contraction of the thermosphere in at least 43 years," John Emmert of the Naval Research Lab was quoted as saying in NASA news report.

Emmert is the lead author of a paper announcing the finding in the June 19 issue of the journal Geophysical Research Letters. "We cannot explain the abnormally low densities, which are about 30 percent lower" than from previous contractions, Emmert told CNN.com.

The thermosphere lies high above Earth's surface, close to where the atmosphere ends and space begins. It ranges in altitude from 90km to 600km above the ground – the realm of meteors, auroras, space shuttles and the international space station.

Emmert suggests that the increasing amounts of carbon dioxide making its way into the upper atmosphere might have played a role in the anomaly.

The contraction of the thermosphere can affect the drag on satellites and space junk orbiting at those levels.

The abnormal change in thermosphere may also affect other layers of the atmosphere, and though less certain, can result in slight disruptions of satellite communications, including global-positioning system signals, Solomon said.

Courtesy: Times of India, July 19, 2010

Asia's corals hit by mass die-out, say OZ Scientists

Sydney: Coral reefs in South-east Asia and the Indian Ocean are dying from the worst bleaching effect in more than a decade, Australian marine scientists said on Tuesday. The bleaching, triggered by a large pool of warm water which swept into the Indian Ocean in May, has caused corals from Indonesia to the Seychelles to whiten and die, Australia's Centre of Excellence for Coral Reef Studies said.

Reefs in the Philippines, Sri Lanka, Myanmar, Thailand, Malaysia and Singapore were also affected by the phenomenon under which sea temperatures rose by several degrees Celsius in Indonesia, researcher Andrew Baird said.

"It is certainly the worst coral die-off we have seen since 1998. It may prove to be the worst such event known to science," he said.

Baird, a fellow at James Cook University, said the magnitude of the event was so large, and the ocean temperatures in some places raised so much higher than normal, that it was "almost certainly a consequence of global warming".

He said for six to eight weeks from mid-May the temperatures were high enough to cause bleaching of the corals in Indonesia's Aceh, the area worst hit by the event. "You jump into the water and you are just surrounded by white and dead corals", he said.

"It is an extraordinary sight. The locals tell us they have seen nothing like this before. This is the second big global bleaching event that we have documented," he said.

Courtesy: Times of India, October 20, 2010

Huge river found on Black Sea bed

London: A massive underwater river flowing along the bottom of the Black Sea has been found by scientists – a discovery that could help explain how life manages to survive in the deep oceans away from the nutrient-rich waters found close to land.

It is estimated that if on land, the undersea river would be the world's sixth largest in terms of the volume of water flowing through it. Researchers working in the Black Sea have found currents of water 350 times greater than the River Thames flowing along the sea bed, carving out channels much like a river on the land, the Telegraph reports.

The undersea river, which is up to 115 feet deep in places, even has rapids and waterfalls much like its terrestrial equivalents. The scientists based at the University of Leeds, used a robotic submarine to study a deep channel that had been found on the sea bed, and found a river of highly salty water flowing along the deep channel at the bottom of the Black sea, creating river banks and flood plains much like a river found on land.

Dan Parsons, from the university's School of Earth and Environment, said: "The water in the channels is denser than the surrounding sea water because it has higher salinity and is carrying so much sediment. "It flows down the sea shelf and out into the abyssal plain much like a river on land. The abyssal plains of our oceans are like the deserts of the marine world, but these channels can deliver nutrients and ingredients needed for life out over these deserts.

This means they could be vitally important, like arteries providing life to the deep ocean. The key difference we found from terrestrial rivers was that as the flow goes round the bend, the water spirals in the opposite way to rivers on land", Parsons said. The undersea river, which is yet to be named,

stems from salty water spilling through the Bosphorus Strait from the Mediterranean into the Black Sea, where the water has a lower salt content.

Courtesy: Times of India, August 2, 2010

UN to Save Maha marine Sanctuary

Sindhudurg: The state forest department has been unable to conserve the first marine sanctuary of Maharashtra at Malwan in Sindhudurg. Recently, the United National Development Programme (UNDP) sanctioned a fund of Rs. 25 Crore which will provide alternative means of livelihood to the fishermen who operate in the core zone of the sanctuary and disturb the flora and fauna. Forest officials are hoping that once fishing is stopped, the sanctuary and underwater life will be preserved. The forest officials have also drawn up a plan to save the vultures in the marine sanctuary and are planning to finance the conservation programme with UNDP funds. The measures will also preserve the swift (a small bird similar to the barn swallow) population that uses the sanctuary area for nesting. Malwan is the first marine sanctuary in India to get UNDP aid. Prior to this, the UNDP gave financial aid to a sanctuary in the Gulf of Munnar: Sawantwadi's former deputy conservator of forests Naresh Zurmure told TOI, "The marine sanctuary was sanctioned by the government in 1987. Soon after the notification, our guards started enforcing the law in the sanctuary. But they were met with stiff opposition and finally they gave up."

Soon after Zurmure took over three years ago, he started drawing up a plan. "We wanted to make the fishermen self-sufficient and provide them with alternative means of livelihood in the field of tourism. They were given boats with glass floors and taught aquaculture, floriculture and coconut thatching. We also acquainted them with other cottage industries like production of kokum sherbet, kokum spread and alphonso juice," Zurmure added. The sanctuary plan faced a lot of opposition from politicians who say that the fishermen would be dislocated.

The work of rehabilitating the fishing communities is being carried out with the help of a consultant D Sarang Kulkarni. Locals are also being trained to turn small lodges with bed and breakfast packages. According to forest officials, once the villagers are given training in promoting tourism, their income will increase and their dependence on fishing will reduce. The Malwan fort built by Chhatrapati Shivaji is located in the same area. "We plan to demarcate the area into a historical zone that will comprise the fort and a tourism zone where fishermen can start related activities", the officials said.

The marine sanctuary is spread over 22 islands called Bertland Island series, but only four are accessed regularly. The islands have swift nesting. The Chinese have been taking the help of locals to steal the nests that are used in soups and some medicines. "The Chinese and the Japanese use the swift's nest as an aphrodisiac. Once the fishermen get alternative jobs and we increase the security cover in the lands, the birds will be protected," said Zurmure.

The Islands and the coast of the marine sanctuary are also used by Olive Ridley turtles for nesting. In 2008, the turtles laid 1,302 eggs and 1,129 hatches. In 2009, about 1,500 eggs were laid and 1,234 hatched. The reduction in fishing activity will also preserve the turtle population.

The forest department has proposed that an officer of the assistant conservator of forest rank should be posted to supervise the sanctuary. A faster patrol vessel to ward off fishing boats and a small motorboat to be used by a forester would also be provided.

According to the plan, the security staff at the sanctuary must be chosen from the fishing community. Besides, an anti-poaching unit of retired Navy and Coast Guard personnel will help reduce anti-wildlife activities, including the smuggling of swifts' nests.

Courtesy: Times of India, August 31, 2010

Elephants gets national heritage Tag

New Delhi: The elephant has been declared the national heritage animal by the government with an aim to step up measures for its protection.

A notification in this regard was issued by the environment ministry on Friday as recommended by the task force on elephant project and approved by the standing committee of national board of wildlife in

its meeting on October 13.

The long awaited move has cheered the conservationists who feel that jumbos, being closely associated with religion and culture in the country since ages, need to be given the same degree of importance as enjoyed by the tiger. The government also plans to amend Wildlife (Protection) Act to pave way for setting up of national elephants conservation authority (NECA) on the lines of the NTCA that has been constituted for the tiger conservation.

"We will introduce it (amendment) in the winter session of Parliament", environment minister Jairam Ramesh had said recently underlining the urgency to protect the jumbos in the country before they could go the tiger way whose count stands just around 1,411.

Declaring elephants as national heritage animal and setting up NECA for their protection are part of recommendations of the elephant task force, set up by the government, in its report "securing the future for elephants in India."

The report has called for protection of jumbos by creating new reserves, curbing poaching and restricting development in the corridors they use to travel between forested areas."

According to the task force, there are over 25,000 elephants in the country, including 3,500 in captivity in zoos and temples-particularly in southern and north-eastern parts of the country.

The panel which laid out a comprehensive action agenda for protection of the pachyderms attributed poaching for ivory and increased conflict between people and elephants for their dwindling habitat.

Courtesy: Times of India, October 24, 2010

RAIN RUINING RELICS

FOR over 1000 years, the Tabo Monastery, located in the remote Spiti valley of the trans-Himalayan frontier region, has weathered many a storm. Considered to be the oldest continuously functioning Buddhist monastery in India, Tabo is now showing signs of wear and tear due to the heavy precipitation in the Spiti valley – a new phenomenon ushered in by global climate change. It is ironic that the monastery, which has weathered harsh and extreme weather conditions in the largely snowbound valley falling in a cold desert, is now falling prey to the increased moisture because of the heavy rain phenomenon. The mud walls and exquisite *thangka* paintings of the monastery are in danger as moisture seepage threatens to widen the ever-increasing cracks due to intense rainfall.

"In the recent past, the area has witnessed much more rainfall than ever before, leading to the problem of water seepage and high moisture levels inside the mud structure", says Chettan Znnqpo, assistant to the head of the monastery. Geshe Sonam Wangdu says the mud wall having beautiful paintings are developing cracks due to moisture, which could lead to their final destruction. "A heritage which we have saved for 1,000 years should not be lost to rain. The steps taken by the Archaeological Survey of India (ASI) seem insufficient as the cracks are still appearing," he says. Pointing towards the paintings of the Buddha on the wall, he shows the cracks while observing that the colours, too, are fading gradually.

The Tabo Monastery, which traces its existence to 996 A.D. has been under the Archaeological Survey of India for its preservation and upkeep. The ASI officials admit that the increased rainfall, hitherto unknown during the summer or monsoons, is causing a lot of problems, forcing them to use tarpaulin sheets to prevent the seepage, leading to damage of the ancient mud structure.

Those in charge of the monastery point out that the use of tarpaulin sheets between the mud layers is adding to the problem as it prevents the moisture from escaping on its own. They say if this is not stopped, the wooden structures in the monastery could also face damage.

The ancient monastery of Tabo in Spiti valley has survived harsh climate, including heavy snowfall that the cold desert experiences, but now it seems to be falling a victim to the climatic changes. "Like all other places. Tabo, too, has witnessed much more rainfall, negligible till a few years back, which is probably why the ancient structure faces a threat from climate change," admits Manmohan Singh, Director, local Meteorological Centre. The monastery, which is frequented by a large number of tourists, foreign as well as domestic, has priceless idols and paintings inside the main complex as well as in the caves. The caves, one main and 30 smaller ones in the mountains overlooking the

monastery, house the rarest of the rare *thangka* paintings, which are not open to the public. These are used by monks only occasionally for rigorous meditation and spiritual quest. With the provision for natural light, electricity, too, is not used inside the main temple of the monastery, lest it causes damage due to sharp light. Special care is taken to ensure that there is no damage on account of other things like strong flashlights of the cameras or loud sound. "We are very particular in what we do here, as there is no way we would want the monastery to suffer even the smallest damage. But much more needs to be done to save it from rain," says Norbu Thayes, principal of Serkong School attached to the monastery.

Judy and Michael from America are simply fascinated by the Tabo Monastery, where they have spent a week. "We can't get enough of the place as every nook and corner has a history to it," says Judy, as she clicks pictures to capture the *thangkas*, murals and, of course, the breathtakingly beautiful landscape against the crystal clear blue sky, kissed by the snow-capped peaks.

With immense potential for tourism in the area, the launch of the much awaited heli-taxi service to provide connectivity to the far-flung tribal areas would help in attracting more visitors, especially the high-end ones, who wish to explore the virgin areas.

With its incredible beauty and rich cultural heritage, Tabo marked its millennium celebrations in 1996, which coincided with the Kalchakra initiation. The Serkong Rabasl Buddhist Culture Society at Tabo is engaged in preserving the rich cultural heritage for the future generations. The thrust is on reviving traditional songs, dance forms, music and popularizing the Bhoti language among the younger generation.

Shower Power

The increased rainfall in the shadow area of the Spiti Valley, where the Tabo monastery is located, in recent years has caused concern with regard to its protection. The figures from June 1 to July 15 this year already indicate much heavier rainfall, basically because of the increased frequency of western disturbance. In the past, there used to be very little rain and more of snow, owing to which the mud monastery did not face much of a threat. Director of the local Metrological Centre Man Mohan Singh says that since Tabo is closer to Kinnaur, the impact of the increased rain is felt much more there than in the Lahaul Valley, which is nearer to Kulu-Manali.

Hail heritage

Popularly referred to as the "Ajanta of the Himalayas" the 10th century Tabo Monastery is located in the Spiti Valley at an altitude of 3050 metres. This ancient seat of Buddhist learning was founded by a great scholar, Richen Zngpo, who was the ruler of the western Himalayan Kingdom of Guge. Having been declared a World Heritage site by UNESCO, the monastery, set up in 996 AD, comes under the Archeological Survey of India (ASI) for its conservation and maintenances. It has the most beautiful *thangka* paintings, a rare collection of ancient scriptures, artifacts and stuccos. Spread over 6,300 square meters, it has nine temples, several Chortens (stupas) and residences for the monks and nuns living there and undergoing rigorous training.

Tourism has been a mixed blessing for the Lahaul-Spiti region. While it has brought in the much-needed cash, it has also put undue strain on its scarce resources.

Courtesy: The Tribune July 25, 2010

BRIDLE THE BOOM

MANOJ JREAT

SANDWICHED between the Zaskar in the north and the Great Himalayas in the south, Spiti is a secluded border region of Himachal Pradesh. Wild, rugged and remote, Spiti conjures up images of a lost land forgotten in time. Sculpted by wind and ice, the surreal landscape of Spiti overpowers even the most seasoned traveler and the sheer scale of its barren mountain landscape makes even the greatest human endeavor look small.

It's hard to believe anything could survive in this cold, desolate place, yet the valley is dotted with tiny hamlets. These villages are like green oases in the cold barren desert and are inhabited by a few thousand hardy people, whose culture is as unique as the landscape.

The Spitiens have adapted their way of life remarkably to the cold desert environment and have lived off the land since times immemorial. The ancient monasteries at Kye, Tabo, Kungri and Dhankar, which are treasure troves of ancient Buddhism, are testimony to the survival of a flourishing culture that has withstood not only the harsh environment but also repeated invasions from neighboring Ladakh and Tibet. The vast wilderness of Spiti is also home to an amazing variety of exotic and rare wildlife, including the elusive snow leopard, musk deer and ibex.

The physical landscape dates even further back to the time when the Himalayas were born. The fossils of marine life scattered throughout the region speak of the earth's past, when the Indian plate collided with the Eurasian landmass and folded the sediments of the Tethys Sea. Spiti, in fact, is an important chapter in the earth's geological history and is an open book narrating this story of the earth's violent past. Over the years, the elements have weathered the mountain ridges, exposing the very backbone of the earth.

Spiti was off limits to foreign tourists until 1994, when it was opened to them, and since then, the number of visitors to the valley has grown steadily.

Last year 2567 foreign tourists entered the valley through Kinnaur district and a thousand more visited it through the Manali route, which is the most preferred route among foreign tourists.

In addition, a greater number of domestic tourists have started pouring into the valley every year, thanks to the better roads that now connect the region to the rest of the state. As a result, a whiff of change is already visible all along the main highway and the impact of this influx of tourists is most visible at Kaza, the sub-divisional headquarters, which is today transformed into a typical tourist town, with concrete hotels and *dhabas* serving exotic dishes. There are also reports of tourists and locals collecting precious prehistoric fossils in the Langza region for souvenirs or sale in the international market.

But venture deep into the remote villages in the Pin valley or Gue village close to the Tibetan border, and they still seem to be wrapped in a time capsule. Here, a traveler is a guest and is offered the best of Spitian hospitality.

Tourism has been a mixed blessing in this remote region so far. It has brought in the much needed cash to the locals and funds for the restoration of the centuries' old monasteries. But additional population pressure has put undue strain on the scarce resources. The bold Spitian landscape is deceptive and very fragile. A gust of wind or an occasional downpour can bring an entire mountainside crashing down to the valley floor. The harsh cold desert also has a limited carrying capacity. Development, therefore, needs to be well planned and fine tuned to the local environment.

Like the oldest monastery in the region, the Dhankar Gompa, which the Spitiens say will be the last to fall, it can only be hoped that the entire Spiti Valley will be the last to succumb to the negative fall outs of modernization and the tourism boom.

Sculpted by wind and ice, the Spitian landscape is very fragile. Hence, development needs to be fine-tuned according to the local environment.

Courtesy: The Tribune, July 25, 2010

2010 to be among 3 warmest years:

This year is set to be among the three warmest since records began in 1850 and caps a record-warm decade that is a new indication of man-made climate change, the UN said on Thursday. "The trend is of very significant warming." Michel Jarraud, head of the World Meteorological organization, told a news conference on the sidelines of a meeting of almost 200 nations in the Caribbean resort of Cancun trying to curb global warming.

Courtesy: The Times of India, December 04, 2010

Human emits 2T of CO₂ a year during digestion

London: Every person emits the equivalent of two tones of carbon dioxide a year through eating – from the time food is taken to when the human body excretes it, a new study has claimed.

Researchers at Universidad de Almeria in Spain have carried out the study and found for the first time that humane excrements contribute to water pollution, primarily with nitrogen and phosphorus. "Food produces emissions of around two tones of carbon dioxide per person and per year (more than 20% of total emissions per person and per year) and consume 20 gigajoules (equal to one billion joules) of primary energy," said lead researchers Ivan Mounoz.

According to the study, producing food from animals, such as meat and dairy products, causes the greatest impact. Agriculture, livestock, fishing and the food industry are the greatest source of carbon dioxide water pollution, but in both cases the effects of human exertion are next on the list. "Human excretion contributes significantly to water polluting through providing organic matter and nutrients, which foster the growth of algae," Munoz said.

Courtesy: The Times of India, November 05, 2010

UN rings alarm bell on saving species

Tokyo: The world must act immediately to stop the rapid loss of animal and plant species and the habitats they live in, the United Nations warned on Monday at the start of a major summit on biodiversity.

The 193 members of the UN's Convention on Biological Diversity (CBD) began gathering in the central city of Nagoya to try to work out strategies to head off a manmade mass extinction.

"The time to act is now and the place to act is here", CBD executive secretary Ahmed Djoghah said as the meeting opened, describing the event as a "defining moment" in the history of mankind.

"The savings from a coordinated ecosystems approach to climate change, biodiversity loss, avoiding deforestation and land degradation are incalculable."

The 12 days conference aims to throw spotlight on a global environmental issue that has drawn less attention in recent years than the related problem of climate change, blamed on a rise in greenhouse gas emissions.

Courtesy: The Times of India, October 20, 2010

Kaziranga park to be extended

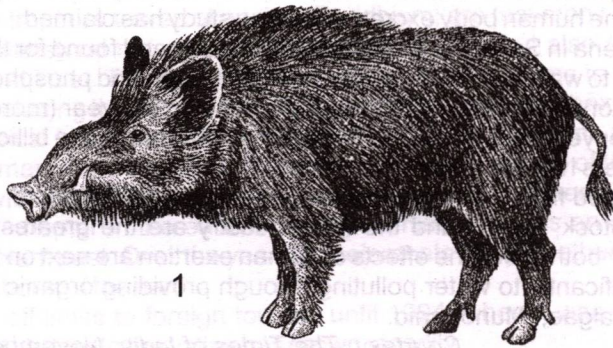
Guwahati: The Assam government is set to complete the legal process for doubling the Kaziranga national park area from the present 430 sq km. State forest and tourism minister Rockybul Hussain said the government was expeditiously trying to settle the land acquisition process for the extension so that animals, including the prized one horned rhinos, were better protected.

Although the park has already more than 800 sq.km area, it was not legally sanctioned thus preventing the authorities from removing human settlements in the proposed extended area. "Very soon we will have the legal formalities completed for the area expansion," he said.

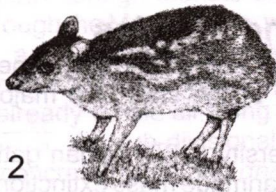
The minister said steps were being taken to plant saplings in 20,000 hectares. A process was also on to raise a Assam Forest Protection Force. Hussains, who also holds the charge of the state's information and public relation department, said an initiative had been taken to project the state's development in proper perspective through booklets, banners and documentaries.

Courtesy: The Times of India, October 20, 2010

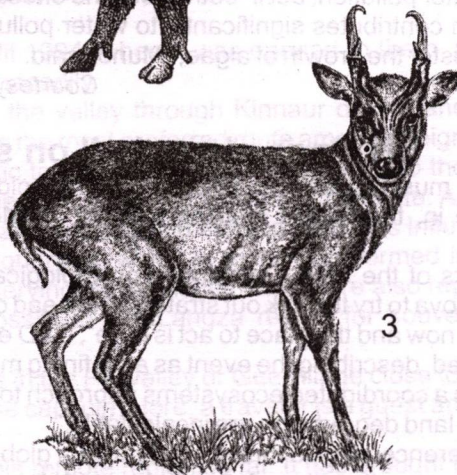
Wild boar & Deers



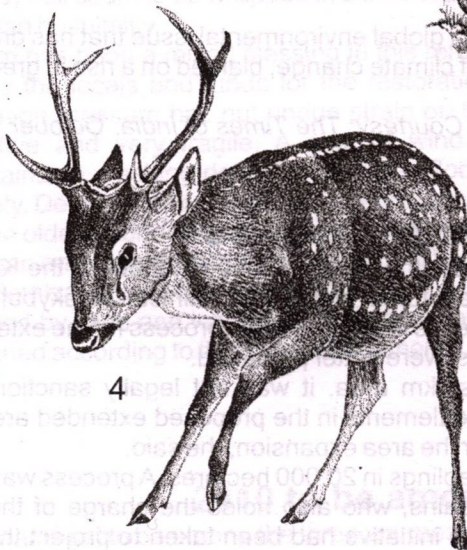
1



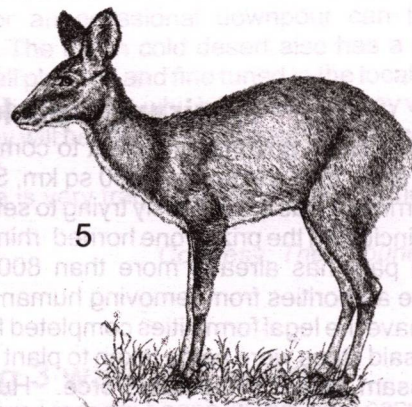
2



3



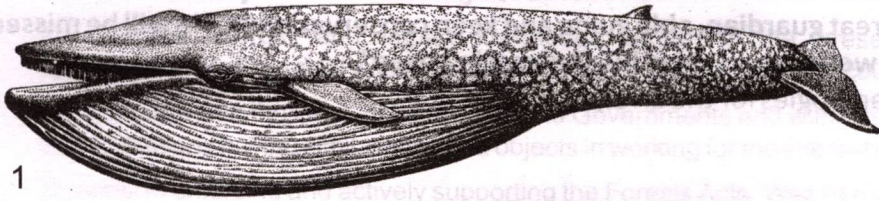
4



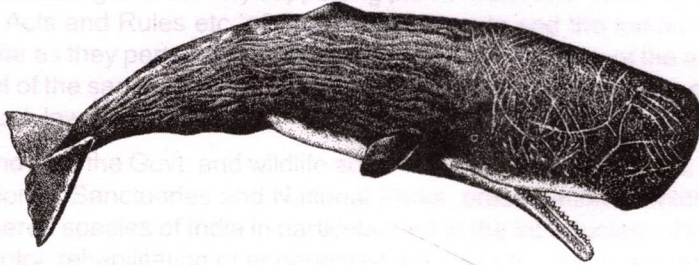
5

1. **The Indian Wild Boar** *Sus scrofa* **Local Names**, Hindi *suar, barba, bad janwar, bura janwar*; mar. *ran dukkar*; tamil *puni*; kan. *hundi*; mal. *kartu punni*; bur. *wet*
2. **The Indian Chevrotain, or Mouse-Deer** *Tragulus meminna* **Local Names**. Hindi *pisura, pisora*; Mar. *pisori, aheda*; Bur. *yun*; kan. *koor andi, kooray*; Tamil *sarugoo marn, kur, kooran panni*.
3. **The Muntjac, or Barking Deer** *Muntiacus muntjak* **Local Names**. Hindi *kakar*; Mar. *bhekad*; Tamil *kart ardu*; Kan. *Kard Koorie*; Bur *jee*; English *Ribfaced deer*
4. **The Hog Deer** *Axis porcinus* **Local Names**. Hindi, Sindhi & Punjabi *para*; Bur. *day ay*
5. **The Musk Deer** *Moschus moschiferus* **Local Names**. Hindi *Kastura mushk*; Kash. *raos, rons*.

Sea Mammals



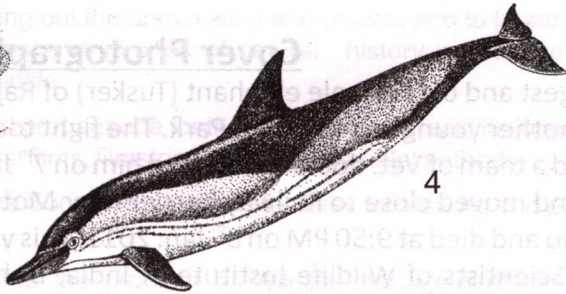
1



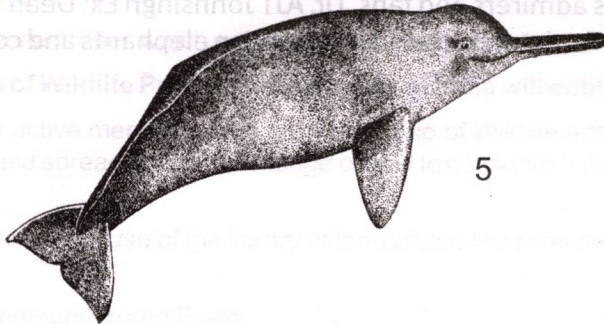
2



3



4



5

1. **The Blue Whale** *Balaenoptera musculus* **Local Names.** Hindi *magar machch*, *hut*, *raghwa*; Mar. *devmasa*; Tamil *thimingilam*; Kan. *thimingila*; San *thimi*
2. **The Sperm Whale** *Physeter catodon*
3. **The Dugong, or Sea Cow** *Dugong dugon* **Local Names.** Tamil *kadalpudru*, *avilliah*, *kadalpanni*; Malayalam *kaddapanni*; Singalese *muda ura*, *talla mala*.
4. **The Common Dolphin** *Delphinus delphis* **Local Names.** Tamil *Pomigra*
5. **The Gangetic Dolphin** *Platanista gangetica* **Local Names** Hindi *sus*, *susu*; Bengali *susk*, *sishuk*; Sanskrit. *sisumar*; Assamese *hiho*, *seho*, *huh*; Sindhi *bhulan*, *sunsar*.

Corrigendum

We regret that last sentences in the Obituary of Late Lt. Gen (Retd.) R.K. Jasbir Singh were not printed in some issues of Vol. 49 No. 1, which read:

"He was a great guardian, able guide and keen conservationist. He will be missed by all his friends and well wishers. May his soul rest in peace".

We apologies for the error,

A.S. Negi

Cover Photograph

Tipu the largest and oldest male elephant (Tusker) of Rajaji NP died on 8th Jan. 2011 due to fight with another young tusker of the Park. The fight took place in Motichur Range of RNP on 6th Jan and a team of Vet. doctors – treated him on 7th Jan. 2011. He started responding to treatment and moved close to Railway barrier near Motichur Range office where he fell in Motichur Rao and died at 9:50 PM on 8th Jan. 2011. This very popular male of RNP was radio collared by Scientists of Wildlife Institute of India, Dehradun in 1996 to study its home range. **Tipu** had a cool temperament and never showed aggression to anyone. He was nearly 65 years of age and weighed 4.5 tones. Loss of such a fine male was mourned by large number of his admirers and fans. Dr. AJT Johnsingh Ex. Dean WII had great affection for him and showed his pictures in all his lectures on elephants and corridors.

The Wildlife Preservation Society of India

1. The aims and objects of the Society are as follows :-

- (a) To promote interest and impart knowledge regarding the preservation and conservation of all forms of wildlife, particularly among the youth of the country.
- (b) To cooperate with the Govt. of India and State Governments and with others Societies and Institutions having similar aims and objects in working for the interests of wildlife.
- (c) To assist in enforcing and actively supporting the Forests Acts. Wild Birds and animals Protections Acts and Rules etc. of State Governments and the Indian Arms Act and Rules in so far as they pertain to wildlife and to bring to the notice of the authorities any infringement of the same and to assist in the detention and prosecution of offenders in respect of such laws.
- (d) To advise and help the Govt. and wildlife administrators in the formation, maintenance and protection of Sanctuaries and National Parks, preservation of wildlife in general and endangered species of India in particular and in the introduction of exotic species into the country, rehabilitation of endangered species etc. and in the formulation and amendments of rules and acts, so as to conserve and increase wildlife stocks.
- (e) To raise funds for carrying out the above aims and objects and to found and maintain museums reading rooms and libraries of natural history in order to disseminate knowledge regarding wildlife.
- (f) To carry out publicity and propaganda for the preservation of wildlife in India by means of monographs, journals, films, filmstrips and other feasible methods.
- (g) To assist members of the Society in obtaining facilities for viewing and photographing wildlife in India.
- (h) To conduct research into the problem of Wildlife management in India, and in pursuance of this, to initiate, encourage and, where possible assist in the projects of the study of threatened species and related objects and to provide reference and research facilities for such work.
- (i) To carry on such other activities which will serve the above subjects.

2. What membership of Wildlife Preservation Society of India will entitle you to ?

- (1) You will become an active member of the growing group of Wildlife enthusiasts, who enjoy working for and spreading the knowledge of how to conserve India's heritage of wildlife for posterity.
- (2) You will be entitled to the full use of the library of the Wildlife Preservation Society and of its reading room.
- (3) You will receive a membership certificate.
- (4) You will receive a personal Identification and Membership Card.
- (5) You will be entitled to buy all publications of the Society at a concessional rate.
- (6) You will be entitled to buy at concessional rates the Societies Greeting Cards, Calendars, Tie, Label badges and the Balance of Nature Game (specially Published in colour for its educative and recreational values).
- (7) You will be supplied "Cheetal", the quarterly journal of the society free.

3. For membership particulars write to Honorary Secretary, Wildlife Preservation Society of India 7 Astley Hall, Dehra Dun.

The Wildlife Preservation Society of India

Patrons:

- (i) Mr. Ravi Singh CEO & Secretary General WWF-India
- (ii) Managing Director Uttarakhand Forest Development Corporation, Dehradun.
- (iii) Director Uttarakhand Council of Science and Technology, Dehradun.

1. President –

Mr. A.S. Negi IFS (Rtd.)

300 Model Colony, Argaghar, Dehradun.

2. Executive Vice President –

Mr. Rajeev Mehta,

Chitra Cinema, Haridwar.

3. Vice President –

Mr. S.K. Banerjee,

53 Inder Road, Dalanwala, Dehradun

4. Ex. Officio Vice President Eastern Zone-

CWLW Assam.

5. Ex. Officio Vice President Southern Zone-

CWLC Tamil Nadu

6. Ex. officio Vice President Western Zone-

CWLW Rajasthan

7. Ex. officio Vice President Northern Zone-

CWLC Madhya Pradesh.

8. Hony. Treasurer –

Mr. S.P., Singh,

Sewak Ashram Road, Dehradun.

9. Lady Member –

Ms. Sumitra Rath,

C/o Mr. K. Rath, Friends Colony, Cuttack, Orissa.

10. Lady Member –

Ms. Reema Pandey,

25 Malviya Road, Laxman Chowk, Dehradun.

11. Member –

Prof. J.S. Bali,

215/6 Rajpur Road, Dehradun.

12. Member –

Dr. Prashant Singh,

14 Municipal Road, Dalanwala, Dehradun.

13. Member –

Mansoor Mazhar,

Muradabad, U.P.

14. Member –

Mr. Pankaj Shah,

178 B, Panditwari, Dehradun.

15. Member –

Mr. R.D. Sharma,

11 Arvind Marg, Dehradun.

16. Member –

G.N. Behl,

122/2 Rajendra Nagar, Street-4, Dehradun.

17. Member –

Upendra Arora,

Natraj Publishers, 17-Rajpur Road, Dehradun.

18. Ex officio Member –

Director Wildlife Institute of India, Dehradun.

19. Ex officio –

Addl. DG Wildlife MOEF Govt. of India

20. Ex. officio –

PCCF Uttarakhand

21. Ex. officio –

Chief Wildlife Warden, Uttarakhand

22. Ex. officio –

Distt. Magistrate, Dehradun.

23. Ex. officio –

SSP Dehradun.

24. Ex. officio –

Director Rajaji NP Dehradun

25. Administrative Officer

Mr. Pravin Singh Rawat

Res. 25/2 East Canal Road, Dehradun Tel.:2654412

Editorial Board

1. A.S. Negi

2. Purva Mehta

3. Dr. S.P. Singh

e-mail: asnegi1943@gmail.com Tel. 2652410